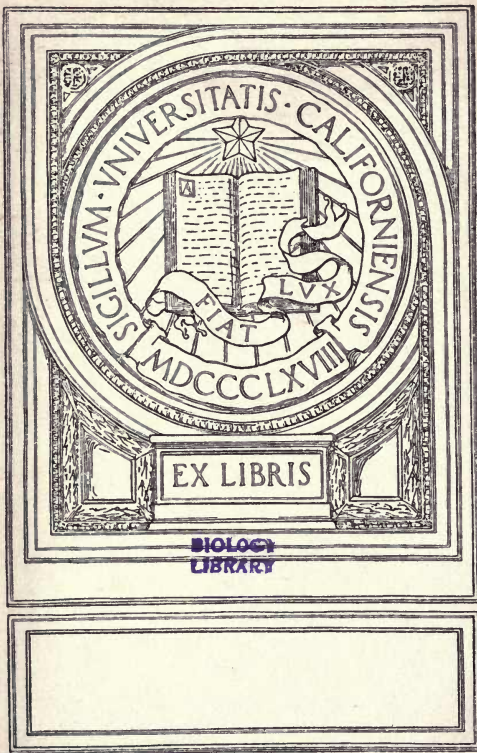


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J. M. Campbell

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Buchanness Lighthouse

Boddam, 14<sup>th</sup> Nov. 1904

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NOTES ON THE  
NATURAL HISTORY OF THE BELL ROCK

*Edinburgh: Printed by George Waterston & Sons*

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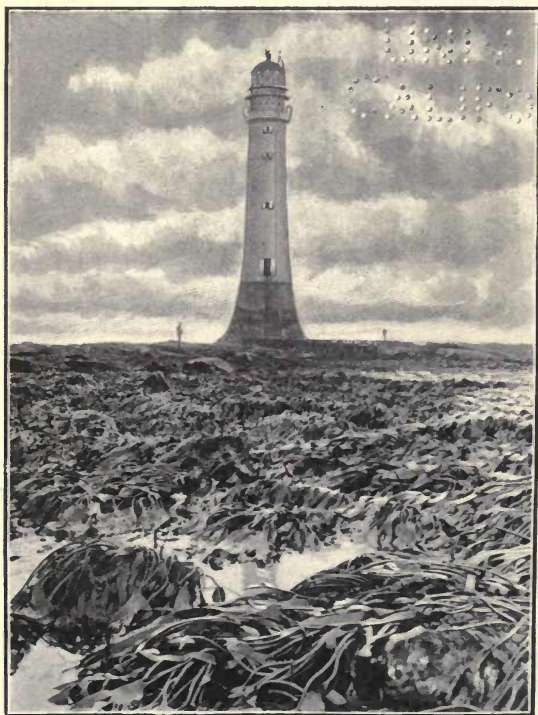
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# NOTES ON THE NATURAL HISTORY OF THE BELL ROCK

By J. M. CAMPBELL

WITH AN INTRODUCTION BY JAMES MURDOCH

LATE SECRETARY TO THE BOARD OF NORTHERN LIGHTHOUSES



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BY J. M. CAMPBELL  
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LONDON: J. B. LIPPINCOTT & CO. LTD. 1904

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THE CUM

## PREFACE.

THESE desultory notes were originally undertaken at the instigation of an invalid friend, desirous of a closer acquaintance with our lonely environments.

At the termination of a nine years' residence on the Rock, I have been advised to publish them in book form, and being fortunate in securing the services of a generous publisher, they are now collected from the columns of the local press and issued in this form in the hope that they may interest the general reader.

I have to thank the Editors of *The Arbroath Guide* and *Chambers's Journal* for their courtesy.

J. M. CAMPBELL,  
*Assistant Lightkeeper.*

BELL ROCK LIGHTHOUSE,

May 1904.

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## FOREWORD

These notes were originally undertaken as a study of an invalidation of a certain type of argument. In the course of the study, however, it was found that the argument in question is of a much wider scope than was at first supposed. It is now, therefore, published in a revised form, and with additions in several places. The additions are in italics. The original text is in the body of the book. The additions are in the footnotes. The additions are in the footnotes. The additions are in the footnotes.

I have to thank the Editors of The Journal of Philosophy for their interest in the work.

J. M. GARDNER

Assistant Lecturer

## INTRODUCTION.

IN consequence probably of my connection of more than fifty years with the Northern Lighthouse Board, and of the almost equally long service of my father, I have been requested, and with much diffidence have complied with the request, to write, by way of Introduction to these very interesting and instructive "Notes from the Bell Rock," a few words regarding Lighthouses, and a short account of the Northern Lighthouse Service and its Lightkeepers. My love for that service, and the esteem I have for those responsible and patient watchmen of the night, whose duty it is to keep their lights burning to guard the mariner from some of the dangers to which he is exposed, and to guide him on his way over the vasty deep, may possibly enable me to say something to interest readers of the Notes in a service whose appropriate motto is "IN SALUTEM OMNIUM."

The origin, as well as the early history, of lighthouses is involved in much obscurity, although we learn from ancient writers that lights of some sort, or beacon fires, were used for guiding vessels or warning them of danger at least three hundred years before the Christian era. The Colossus of Rhodes and the Pharos of Alexandria are those that we first read of, but very little authentic information is to be got regarding them. At a much later date we know that sea lights for such purposes were produced by the burning of wood and coal in chauffers on coasts where they could be well seen. One such beacon fire was shown from a tower on the Isle of May, at the entrance to the Frith of Forth, from the year 1635 till 1816, when the present lighthouse was built, and is supposed to have been the first sea light

on the coast of Scotland. It is not unlikely, however, that long before that date some of the most dangerous parts of the Mediterranean were lighted in a like primitive manner.

The first lighthouse of any note of which we have authentic record is the Tour de Corduan, near the mouth of the river Garonne, in the south-west of France, which was founded in 1584, but not completed and lighted till 1610. On account of the style and grandeur of its architecture, it was long regarded as one of the wonders of the world, the Pharos of Alexandria having been regarded as another. Its lightroom was originally constructed for the combustion of wood in a kind of chauffer raised six feet above the floor of the lantern ; but it has undergone many alterations and improvements since then, to bring it into keeping with the progressing and modern system of lighthouse illumination, which has made great strides during the last half-century.

Winstanley's wooden structure to mark the Eddystone Rock off Plymouth was probably the next work of importance in lighthouse building. It was lighted in 1698, but washed away in a storm about five years afterwards when Winstanley, who had gone there with some workmen to execute certain repairs, and the lightkeepers all perished. A subsequent lighthouse, also of wood, on the Eddystone, was accidentally burned down about fifty years later, after which Smeaton's structure of stone was placed on it. This building stood until a few years ago, when it was seen the sea was making such serious inroads on the rock on which it was founded, that it was deemed advisable to take it down and have another built on a different part of the reef. The success of Smeaton's lighthouse having been assured, attention was directed at the beginning of last century to the Bell Rock, which was a source of great danger to vessels navigating the East Coast of Scotland, and particularly to those

sailing to or from the Friths of Forth and Tay, many of them being lost on it.

The Commissioners of Northern Lighthouses accordingly resolved to erect a lighthouse there, somewhat after the model of Smeaton's Eddystone, but the work proved to be a much more difficult and arduous undertaking owing to the Rock being always covered by the sea, except for a short time at low water, whereas the Eddystone was never altogether covered, even at high water. The Bell Rock is a low flat lying reef, the surface of which becomes uncovered to any extent only at low water of spring tides, but on which at high water there is a depth of from twelve to sixteen feet. Its extent is about 1400 or 1500 feet in length, with a breadth of about 300 feet. In olden times it was known as the Inchcape Rock. Tradition has it that at one time an Abbot of Aberbrothock being impressed with its danger, and anxious to avert to some extent, if possible, the loss of life which often occurred on it by shipwrecks, moored thereon a buoy or log of wood, having a bell attached to it, which the action of the sea tolled continuously, thus giving warning of danger. It afterwards became known as the Bell Rock. Tradition also says that a pirate known as Ralph the Rover, who frequented these seas, finding that the bell interfered with his nefarious occupation, removed it. Retribution, however, was not long of overtaking him, for it is said that his vessel shortly afterwards struck on the reef and was lost with all on board. Southey's graphic ballad, descriptive of the legend, entitled "Sir Ralph the Rover," is so well known that it is quite unnecessary to do more than refer to it here.

The sanction of Government having to be procured before the erection of the lighthouse could be proceeded with, considerable time was occupied with the necessary negotiations, but in 1807, Mr Robert Stevenson, the Engineer to the

Northern Lighthouse Board, was allowed to commence operations, and after encountering and overcoming innumerable difficulties by his indomitable skill, energy, and perseverance, he at last completed the work, and had a light shown from it on 1st February 1811. It is very satisfactory to be able to state as testifying to the excellency of the materials used in its construction, as well as to the careful and well devised scheme and execution of the workmanship, that the tower as yet shows no symptoms of decay, and stands as strong to-day as when newly erected.

In a highly interesting lecture which the writer of the Notes delivered at Arbroath, about a year ago, he thus described the lightroom and lighting apparatus, which had just been renewed, not on account of tear and wear, but to bring it up to present day standard :—

“In the centre of the floor stands the revolving machinery enclosed in a heavy metal case, upon which the huge lens, with its supporting carriage, revolves. The lens itself—a marvel of the glassmaker’s art—is the production of a French firm. Imagine a huge saucer, twelve feet in diameter, composed of twenty concentric prisms of purest glass, each with a diameter almost as much as a man may enclose with both hands, terminating centrally in a sixteen inch plano-convex lens or bull’s-eye. Suppose the rim of this saucer to the extent of four prisms be turned sharply inwards, the whole set vertically on edge—convexity outwards—and a vertical section—in which the bull’s-eye and three adjoining prisms are alone intact—projected a foot further forward, one may gain some idea of that particular portion of the lens allotted to the red flash, the colour of which is attained by means of sheets of red glass attached inside the central section and on the outside of the adjoining wings. On the opposite side of the lens, and in a line with the central red section,

is a similar section—minus the adjoining wings and the red media—through which the white flash is transmitted. Both flashes are intended to equal each other in intensity, which accounts for the much smaller portion of the lens allotted to the white. A belt of horizontal prisms, three feet wide, connects the wings of the red section with the white on either side, and reflects the rays of light equally to both sections. Stooping underneath this belt, access is obtained to a fixed circular platform in the interior of the lens. In the centre of this platform, upon an iron pedestal, is placed the source of illumination, a large six-wick lamp. Between this platform and the top of the machine case, the circular carriage upon which the superstructure of the lens is erected revolves upon twelve five-inch steel rollers travelling upon a circular metal pathway. Attached to the under side of this carriage is a heavy gun-metal ring, six feet in diameter, toothed on its inner circumference, which engages with a horizontal pinion wheel rising from the corner of the machine case, and through which the driving power is transmitted. The machine—an exaggerated form of clockwork—is driven by a weight of 400 lbs. travelling in the centre of the spiral stair on the first flat. The speed of the machine is regulated by adjustable fans; and a speed indicator, furnished with an alarm bell, intimates the periods of winding—an operation necessitating two minutes' stiff winding every half-hour. The entire lens, with its supporting carriage, is estimated to weigh about six tons. The lamp, as I have already stated, is placed upon an iron pedestal in the centre of the platform, or service table, as it is called, in the interior of the lens. It is fitted with what is known as the stepped Doty burner, and carries six concentric wicks, each slightly elevated above the other towards the centre. The burner is six inches in diameter, and consumes paraffin oil at the rate of eighteen gills per

hour. To maintain this supply, a forty gallon tank of polished brass is placed on the lightroom floor; and a small force pump, with triple plungers, working in conjunction with the revolving machine, maintains a constant supply of oil, which is kept cool by circulating within an inch of the burning edge of the wicks, the surplus oil returning to the pump-tank. The flash, on being transmitted through the lens, is reckoned to be equal to 60,000 candles; and the characteristic of the light—a red and white flash alternately every half-minute—visible twenty miles distant.”

A description of the work of renewal of the lighting apparatus and the erection of a new and enlarged lantern to hold it on the top of the tower, is also given in the Notes; and no further reference to it is needed than to say that the light, which has the same characteristic as before, is now, by means of the new apparatus, made much stronger and more brilliant.

Such an erection as this lighthouse—standing, as it were, a pillar in the ocean, with a stormy sea raging round it—may surely be described as one of the noblest and most wonderful works of man. As no ship has been wrecked on the Rock since the light was first exhibited, it is incalculable how many valuable lives may have been saved by it. Sir Walter Scott, on the occasion of his visiting the Bell Rock as the guest of the Commissioners on their annual tour of inspection in 1814, gave beautiful expression to his feelings in the following appropriate lines, which he wrote in the Lighthouse Album:—

PHAROS LOQUITUR.

Far in the bosom of the deep,  
O'er these wild shelves my watch I keep,  
A ruddy gem of changeful light  
Bound on the dusky brow of night;  
The seaman bids my lustre hail,  
And scorns to strike his timorous sail.

The Eddystone and the Bell Rock Lighthouses having been, as it were, the forerunners of the class of lighthouse that required to be built on rocks exposed to the full fetch of heavy seas, many more of the same sort have since been erected off the coasts of Great Britain and Ireland. That of Skerryvore, which is situated in the Atlantic, west of the Island of Tiree in Argyllshire, is regarded as probably the finest specimen of lighthouse architecture in the world. This lighthouse was the creation of Alan Stevenson, who succeeded his father, Robert, as Engineer to the Northern Lighthouse Board, and it is interesting to know that the designing and engineering of the Northern Lighthouses has now been in the hands of the Stevenson family for more than a hundred years, Mr David Alan Stevenson, one of the grandsons of Robert, now holding the position of Engineer to the Board. But the family is not altogether indebted to lighthouse engineering for its fame, as the late talented and lamented writer and novelist, Robert Louis Stevenson, who made a world-wide name for himself, was another grandson of the Bell Rock Engineer.

It is not necessary to say more about lighthouses, but I considered it desirable to give a short description of one or two of the most notable, including that of the Bell Rock, in which these Notes were written, to show from what limited sources a man of intelligence and keen observation can procure subjects of surpassing interest to engage his attention, as well as to instruct and amuse others.

The Lighthouse Authorities of the United Kingdom are the Trinity House for England, the Commissioners of Northern Lighthouses for Scotland, and the Commissioners of Irish Lights for Ireland. The Trinity House exerts a certain control over the Scottish and Irish Boards, particularly as to the site and character of lights proposed by them, and

the Board of Trade holds the financial control of all three. The Boards are not all similarly constituted, the members of the Trinity House being mostly men of nautical knowledge, while those composing the Irish Board are mostly connected with the Corporation of Dublin. The Commissioners of Northern Lighthouses are the Lord Advocate and the Solicitor-General for Scotland, the Lord Provosts of Edinburgh, Glasgow, Aberdeen, and Dundee; the Provosts of Greenock, Inverness, Campbeltown, and Leith; the eldest Bailies of Edinburgh and Glasgow; and the Sheriffs of the maritime counties of Scotland. The origin of the Board dates from 1786, and it was incorporated by an Act of Parliament passed in 1798. The primary and general object of the three Boards is the erection and maintenance of lighthouses and other sea marks, such as beacons and buoys, for the security of navigation and the saving of life and property. The funds for these objects are got by levying tolls on shipping.

In 1815 the Northern Lighthouse Commissioners acquired the right to erect lighthouses on the Isle of Man, which since then has been under their jurisdiction.

In olden times, many lighthouses in England and Ireland were the property of private individuals, who had the power of charging dues for their erection and maintenance; but the Isle of May light was the only one of that kind in Scotland, and it became the property of the Commissioners of Northern Lighthouses by purchase in 1814. The tolls or dues have long been collected for the different Boards by the Collectors of Customs at the various ports, and are now paid into what is called the "General Lighthouse Fund," which is held by the Board of Trade, and on which the Lighthouse Boards draw according to their requirements. Sixty years ago this tax, as it may be called, on shipping varied as regarded different lighthouses from a farthing to one-penny-halfpenny

per ton for each light passed, the rates on over-sea voyages being generally double those for coasting voyages; but since then they have frequently been reduced, both in amount and in incidence. Ships of the Navy and all lighthouse vessels are, of course, exempt from such dues. On 1st April 1899, an alteration was made by which vessels were no longer charged a rate per ton for each light passed, but a rate per ton per voyage, and in some cases a rate per vessel; and a deduction was made when a number of similar voyages took place during the year. Very recently, a further reduction has been granted by an abatement of twelve-and-a-half per cent. on the total. This, of course, is all paid by the shipowners, who have long been, and still are, discontented at being charged for light dues at all, their contention being that all the expenditure necessary for erecting and maintaining lighthouses and other sea marks should be paid out of the Imperial taxation of the country. They also now desire to be represented on the three Boards, and have a share in the management. I, who have seen half-a-century's administration by the Commissioners of Northern Lighthouses, may be allowed to express an opinion that it would be very difficult to construct a Board to do its work better than the Northern Lighthouse Board. The Commissioners require no eulogy from me; but I cannot imagine any other body of men, be they scientific or unscientific, nautical or commercial, paid or unpaid—and be it noted that the Commissioners are all unpaid—taking more interest in their work, or devoting more time and attention to it. The introduction of shipowners, who may have conflicting interests to serve in the lighting of different parts of the coast, might introduce an element of discord from which the present Board, so far as I am aware, has always been exempt.

The staff of the Board consists of an Engineer and a

Secretary, who also acts as General Manager, with an accountant, examiner of accounts, and five clerks. Then there is a superintending staff, consisting of a superintendent, with an assistant, and three district superintendents. Four small steamers, the property of the Board, deliver stores and oil, and fill with gas the lighted beacons and buoys, as well as relieve the keepers at some of the rock lighthouses. A number of boats also attend certain island and remote stations. There are more than 200 lightkeepers attached to about 80 lights, most of these lights being attended by two keepers, one acting as principal and the other as assistant. At rock and fog signal stations, however, there are three or four keepers, according to requirement; such lighthouses as the Bell Rock, Skerryvore, and several others of that class having four. At the Isle of May, which is an electric light station, there is an engineer in charge, with six assistants. Besides these, there are also a number of small beacon and subsidiary lights which do not require the personal attendance of lightkeepers. In the early part of last century lightkeepers were mostly chosen from the seafaring class, or from men who resided in the district in which a lighthouse was placed, and age was considered no detriment so long as they were able-bodied and of good character. The Scottish Board never employed women as lightkeepers, but not very long ago it was customary in certain cases for lightkeepers' wives to act in this capacity in Ireland. As lighthouses increased in number, applications to fill the post of lightkeepers also became more numerous, and now it is almost essential that an applicant, in order to get his name placed on the expectant list, should be either a mechanic or a seaman. Before receiving an appointment he has also to undergo a period of probation at one or two lighthouses, where he gets instruction in his duties. There is now so much delicate and

expensive machinery in lightrooms that those placed in charge should not only have skill to keep it in good working order, but be able to execute slight repairs should accidents occur. It is also found that seamen are most suitable for rock or island stations, where there is much boating or landing of stores and provisions, their early training and familiarity with the sea giving expertness to their movements and a confidence which few landmen can ever acquire. There is now an age limit for entrance to the service, consequently all are young when first appointed, and before getting an appointment require to pass an examination in reading, writing, and arithmetic, and give evidence of general intelligence. They must also pass a medical examination to prove that they are free from physical defects and have a sound constitution, and freedom from colour blindness. At sixty years of age they may retire, and at sixty-five they must do so, pensions being awarded them according to their period of service. The day duties are light, except during spells of fog, when at those stations where there are fog signals, and the sirens require to be continually sounded, close attention must be given to the engines and machinery connected with them. The night duties are divided into watches similar to those adopted on board ships. Lightkeepers are not allowed to read, write, or work while on watch in the lightroom, as duty there requires all the attention they can give to keep the lights burning brightly, and at revolving lights to watch and wind up the machinery periodically. Then during certain states of the atmosphere the glass of the lantern requires cleaning, more especially when snow is falling on it and obscuring the light. A graphic description of this operation at the Bell Rock is given in the Notes.

The lives of all lightkeepers are insured, and much is

done to make their position and that of their families a comfortable one. They have a liberal allowance of holidays ; and, if sickness overtakes them or any member of their families, medical attendance and medicines are furnished by the Board practically free. Comfortable dwelling-houses, with a certain amount of furniture, are supplied to all of them, with uniform clothing, bedding, cooking utensils, coal, and oil for lighting purposes. When men are doing duty on rock lighthouses, their food and all their wants are, as a matter of course, supplied. At stations remote from schools, a boarding allowance is given to enable lightkeepers to get their children boarded and educated elsewhere. Nor must I omit to mention that all are liberally supplied with illustrated and other newspapers, monthly periodicals, and books of useful and general literature. Lightkeepers and their families at most island stations have also means afforded them for occasional attendance on Divine ordinances. They have time to indulge in hobbies, such as handicraft of various kinds, from the making and mending of shoes to the construction of beautiful models of lighthouses and ships, or, like that of the writer of the Notes, the studying of the natural history of the objects around them. I knew one who, on the eve of his retirement, built for himself a small boat of plate iron, in which he afterwards used to go fishing.

The lights shown from lighthouses have all special characteristics—such as fixed, flashing, or a variation in colour—to distinguish them from each other, and to enable the mariner when he sights them to know exactly off what part of the coast he is. Unfortunately, this does not always prevent shipwrecks occurring ; for, although he should not do so, sometimes the mariner mistakes his light, and runs into danger instead of out of it ; or fog may render a light

invisible ; or a storm may drive a vessel on a lee shore in spite of any light. It might be said that wrecks should never occur from the first of these causes, viz., a mariner mistaking his light ; but sailors are sometimes careless, like other people, and only learn their lesson when too late. It is different, however, when a master or officer has been storm tossed, probably for many days and nights, without seeing the sun or stars to give him an idea of his whereabouts. Suddenly the fog lifts a little and he sees a gleam of light which, in the anxious state of his mind, he supposes to be one which he thinks he ought to be approaching, and then taking, as he supposes, his correct course, runs on the rocks. Such a case occurred about five years ago, when the s.s. *Labrador*, bound from Halifax, Nova Scotia, to Liverpool, was lost on the Skerryvore reef. The captain had not been able for many days to take an observation owing to fog, and the tide had evidently carried him further to the north than he reckoned on, when suddenly the light of Skerryvore appeared, and mistaking it for a light on the north coast of Ireland, he unfortunately altered his course, with the result that the ship ran on a portion of the Skerryvore reef and became a total wreck. Fortunately, all on board were saved. Two boat-loads of crew and passengers were picked up by a steamer and landed on the Island of Mull ; while another boat, containing the remainder, eighteen in all, reached the rock where the lighthouse stood, and, assisted by the lightkeepers, landed and found shelter there, and had all their wants attended to till the lighthouse steamer *Hesperus* went to their assistance and took them to Oban. Many acts of heroism since that of Grace Darling have been performed by lightkeepers in saving life from shipwreck, and have been suitably acknowledged by the Lifeboat Institution or Humane Society. A short time ago, two daughters of the

principal lightkeeper at Kyleakin, observed a sailing boat struck by a squall off the lighthouse, and its occupants (two men) thrown into the water. The tide was running fast, and as there was no time to lose, they rushed down to the shore, and, getting into a boat, rowed out to where they saw one man struggling in the water, and, after taking him on board, rowed after the upturned boat, which had the other man clinging to it, and saved him also.

In closing my short Introduction I cannot do better than refer to a visit paid to the Bell Rock Lighthouse by some fifty members of the British Association in 1850, and give a few quotations from a speech made by Dr Robinson, of Armagh, at a general meeting of that Association held in Edinburgh shortly afterwards, when he moved a vote of thanks to the Commissioners of Northern Lighthouses for their courtesy in conveying the party and showing them over the Lighthouse. He said he had been led to an object which, almost from the days of his childhood, engrossed his attention, and which he had ever regarded as one of the wonders of the world.

“When I visited that marvellous, beautiful structure, rising up in its strength and loneliness out of the deep, I found that though the sea was calm and the wind was still, yet there was quite enough of danger in the enterprise of approaching it. Under these circumstances it enabled the mind to call up for itself the terrors which must in former years have beset those who were unhappily entangled in that wilderness of rocks, which that noble structure now crowns as a beacon. . . . It was impossible not to feel admiration for the beneficent courage and the mechanical skill of the late distinguished engineer, Robert Stevenson. . . . When I thought of the extraordinary resources, both of wealth and talent, that must have been accumulated to over-

come such a tremendous difficulty, I naturally looked to the nature of the power by which such marvels had been achieved, and I found not a mere unenlightened body of what are called practical men, of persons who followed the road of experience, going always into the same old track, and incapable of availing themselves of the progress of the age to perfect their feeble endeavours. I found I was among men who were able to teach me in many important facts regarding which I had in vain sought for information for years, and which I learned in that excursion. . . . When I was led to ask the question, Who are the controllers of this admirable system? I learned with surprise that the Commissioners of Northern Lighthouses are not a set of salaried functionaries, whose professional habits might have led them to interest themselves in these pursuits, but a body of lawyers and municipal magistrates."

Dr Robinson's appreciation of the Commissioners in the important services they render to the shipping interests is, I am sure, shared and endorsed by all who know or have known the Commissioners of any period.

J. M.

EDINBURGH, *August 1904.*



BOOK OF  
NOTES  
ON  
THE NATURAL HISTORY  
OF  
THE BELL ROCK.

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*APRIL 1901.*

I WONDER how many people have had the pleasure of a trip to the Bell Rock Lighthouse. I don't mean the customary trip per summer steamer, which keeps at a very respectable distance, and gives one but a faint idea of what the building is really like; but those who have made a landing on the Rock, and spent an hour or two in admiring the ingenuity and skill displayed in the erection of this noble structure, which has so bravely stood the test of almost a century's storms. It is not my intention to enter into a detailed description of the Lighthouse, but merely to jot down in haphazard fashion any little items which may serve to interest or amuse the general reader. The usual signs which to the landsman's eye chronicle the passing seasons are here unknown; but to us, the fish, shell fish, marine plants, migratory birds, etc., constitute an endless calendar. Early this month the flocks of eider and long-tailed ducks, which have been in close attendance since September, have gone housekeeping, and one belated pair of eiders alone remain, evidently as undecided as some of their human contemporaries about taking the important step. The gulls, which have been levying blackmail from the ducks all winter, have almost all disappeared, and we miss their raucous voices at our door, contending for the after-dinner scraps. One would scarcely credit the swallowing capacity of these omnivorous birds. A piece of ham skin, nine inches long and

three inches broad, and about the consistency of sole leather, was greedily bolted by a blackback without apparent effort. These birds, though not classed as divers, I have frequently seen go completely under water to recover a sinking tit-bit. I had an interesting view from the balcony the other morning of a seal which was breakfasting off a full-sized cod which he had just captured. Seizing the fish by the shoulders in his teeth, and pushing it from him with his fore flippers he tore off a great strip clear to the tail. Elevating his head in the air, he gulped it over. Diving after the disappearing fish, he quickly had it on the surface again, and the pushing and tearing repeated till there was nothing left but the head and backbone. A couple of gulls kept circling and screaming over him, picking up any strayed pieces which came their way, but he took good care their share was small, and kept a wary eye on their movements, evidently suspecting they had designs on the fish itself. They, in turn, I noticed, always kept their wings elevated when resting for a moment on the water awaiting his reappearance with the fish, prepared to shoot into the air should he attempt to rush at them.

The white whelk, whose numbers here are legion, are now making their appearance from their winter quarters, where, in sheltered nooks and crannies, they have successfully resisted the winter's gales. Unlike some of their species, which subsist solely on marine plants, they are not vegetarians, but, spreading themselves over the Rock like a devastating army, they devour all animal matter they come across. Armed with a strong muscular proboscis, containing within itself the necessary boring apparatus, and which consists of a cylindrical implement, the extremity of which forms the mouth of the animal, and is surrounded by two strong muscular lips, enclosing a tongue, armed with spines, they are able, by the joint action of tongue and lips, to perforate the hardest shells. Fixing itself on the defenceless mussel, the boring operation is carried on through the furrow on the one side of the rim of the whelk, and a neat cylindrical orifice, no bigger than a pinhole, is eventually made in the mussel shell, through which the tongue

is thrust and the contents gradually extracted. Two years ago the Rock was literally covered with patches of immature mussels, but is now completely denuded by these rapacious hordes. Some seasons the mussel spawn is pretty much in evidence here, but they never come to maturity; the white whelk takes care of that; but apart from that cause, it is doubtful if they could manage to subsist in such a boisterous situation. The workmen, while employed here in the building of the Lighthouse, in order to regale themselves with a fresh diet occasionally, made the experiment of transplanting mussels from the shore, but without success. The white whelk was evidently considered the chief offender, as barrels of them were collected and destroyed without any appreciable diminution of their numbers. The attempt was ultimately abandoned in disgust.

"All is not gold that glitters," neither does every whelk shell enclose its legitimate owner. Pick up that one which moves with such unusual speed through this shallow pool, and you will find a pair of lobster like claws dangling from its mouth. Gently crack the shell—for you will find it next to impossible to extract him alive otherwise—and you will see, what one may be pardoned for supposing, a miniature lobster, but which in reality belongs to another distinct species, namely, the hermit crab. Whether he has obtained occupancy by force of arms or merely through decease of the original tenant is a moot point, but the first supposition is highly probable, as he is a most belligerent little customer. An amusing sight may be witnessed by placing several of them, deprived of the shells, in an ordinary soup plate, with a little sea water and some empty shells—fewer shells than crabs. The fighting and struggling to secure houses is ludicrous in the extreme. One may be seen almost successful in mooring himself within a shell—which, by the way, is effected by means of the shelly plates at the extremity of his soft, twisted tail—when another seizes him by the nape of the neck, as it were, and he is dragged reluctantly forth. The evictor still holds him struggling at claw's length, and

not until he himself is safely ensconced does he relinquish his grasp. Others, again, may be seen prospecting the interior of a shell. Extended at full length on the top of the shell, with their claws groping within, one is forcibly reminded of a person "guddling" for trout. Should there be any portion of the original whelk remaining in the shell, this, after repeated tuggings, is cleared out. The tail is then inserted, and the whole body withdrawn into the shell, providing it is large enough; if not, he stands a bad chance of being evicted by the next pugnacious house-hunter.

## *MAY 1901.*

FLOWERY May! Well, not exactly. To us here this month generally spells fish, and is looked forward to as a pleasant change from the usual regime. It may probably surprise many to learn that though planted here, right in the centre of the fishing grounds, our table for the greater part of the year is "fishless"; for, unlike Mahomet and the mountain, the fish must come to us, even to our very door—for from our doorway the most of our fish are caught, save an occasional one taken with rod and line from the deep pools left on the Rock by the receding tide. The catching of fish from one's doorstep will be easily understood when it is known that a stumble from our door at full tide means a sheer fall of fifteen feet into two or three fathoms of water. A stay fixed in the doorway, with its outer end attached to the landing-slip fifty feet from the tower, carries a weighted pulley, to which is attached the fishing line, while pending from the pulley is the snid and hook. The pulley is carried to the extremity of the stay by its own momentum, and is hauled back by means of the fishing line. The most of our fly-fishing is carried on with this apparatus, our largest catches being generally in the fall and consisting principally of poddlies, with an occasional lithe or cod. Strangers often ask why we do not keep a boat here; it might almost as reasonably be asked why we don't keep a cow. Simply because we have not the necessary accommodation—that is, unless one could be devised with the properties of a limpet, and be none the worse for several hours' immersion every tide. Besides, our Commissioners have decreed that it would not be advisable, as the temptation to wander might end in our being cast away, and the possible result of the Rock being left even for one night without its customary warning light might be too horrible to contemplate.

*Cyclopterus lumpus* is again with us. This is not a new form of the plague, but merely the technical term for the fish called the lump-sucker, better known on the East Coast as the paidle-cock and paidle-hen. Early this month they annually visit the Rock to deposit their ova. This the hen does in some convenient angle of the Rock, often so ill-judged as to expose the nest at low water. The ova is cemented into a compact mass, and adheres to the Rock by means of a gelatinous envelope surrounding each egg. This operation performed, the hen evidently considers her share of the contract as finished, as she immediately clears out to deep water, leaving the cock to mount guard over the nest. This duty he faithfully performs, as he is always to be seen with his nose close up to the ova, and never seems to leave it for a moment. I have frequently taken them away from the nest and placed them in a different part of the pool, but they invariably returned to their post. A stick or other substance intruded in the vicinity of the nursery is viciously snapped at. The ova seems to be considered a desirable dainty by other fishes, as the stomachs of the cod caught by us bear indisputable evidence of the cock's inefficiency as guardian of his embryonic progeny. The hen is about eighteen inches long, and of a somewhat repulsive appearance. The cock is about half this size, and more attractive, being brilliantly coloured, combining various shades of blue, purple, and rich orange. A broad sucking disc between the pectoral fins enables the fish to moor itself to the rock and maintain an upright position. The dorsal ridge somewhat resembles a cock's comb, and is probably the origin of the name paidle-cock.

"Treasure-trove—Discovery of Specie on the Bell Rock." There is a heading for a sensational article, recalling visions of that fictitious personage Ralph the Rover and his ill-gotten wealth. Well, many a yarn is built on a less slender foundation. Here are the facts:—The specie did not consist of Spanish dollars stacked in massive oaken coffers, but of a similar metal enclosed in a far more ingenious receptacle,

simply a shilling in a live mussel. The shilling appeared as crisp as if newly struck, and bore the date 1839. It had turned a dark brown colour and had some filaments of the byssus or "beard" of the mussel adhering to it. The mussel was one of a quantity taken from underneath Granton Pier, and was being opened here for bait purposes when the "discovery" was made.

On the evening of the 20th inst. we had a grand view of a flotilla of torpedo destroyers steaming south. Although the sea was comparatively calm, they appeared to be making heavy weather of it; they literally "shovelled" the sea over themselves, and the steersmen, being placed further forward than in ordinary vessels, were being continually drenched. The terrific speed and the flames spurting from their short, stumpy funnels suggested the idea of their being on an errand of life and death rather than on a peaceful tour.

We have just completed a small aquarium, by means of which we hope to become better acquainted with the more minute organisms with which the Rock at this season of the year teems. Apart from the study of man himself, what can be more interesting than to be an actual eye-witness of the gradual evolution of the different forms in the great life-scheme of the Creator, from the simple nucleated speck of protoplasm (*amœba*), which multiplies by simple division, to the more complex structure of the members of the vertebrate kingdom?

## *JUNE 1901.*

A HEAVY, pounding, nor'-east swell in the early part of this month has almost denuded the higher portions of the Rock of the young vegetation, the tangles being as cleanly cut as if by a reaper. The paidle-cocks' nests also suffered, as not a vestige of them was left. Several cocks have been seen wandering aimlessly about, their occupation evidently gone.

On the afternoon of the 14th we had a heavy shower of hail, accompanied with loud peals of thunder; but on the whole the month has been fairly good. At high water on several days the Rock was literally black with poddlies feeding on young sand eels, half-a-dozen terns and several small gulls joining in the feast, while a number of gannets kept wheeling and diving in the vicinity, evidently picking up a decent living. The continual splashing of the fish in pursuit of their prey could be distinctly heard by us through our open window while lying in bed. Strange to say, our efforts to "take in" a few of them met with but little success; probably the sufficiency of eels was the cause of their ignoring our questionable lure. The few that we caught were choke full of eels, several of which were disgorged in our doorway still alive.

On the 4th of the month we had a visit from a carrier pigeon, which had evidently strayed in the haze. It carried no message, but was stamped on the wing, and had a numbered rubber ring on its leg. After feeding, it was liberated next morning, with a message attached. We occasionally have similar visitors. Last year one of them landed home in Warwickshire—the owner thanking us and enclosing a consideration for our kindness to the bird.

“There’s nothing new under the sun.” This much quoted aphorism was forcibly suggested to our minds the other day while collecting specimens for our aquarium. In the first instance, a spider-crab, which, when stranded high and dry, appeared but an unsightly mass of tangled seaweed, when placed in the aquarium assumed all the beauties of a verdant grove. From every available point on the upper surface of his mossy-covered shell beautiful variegated plants streamed and waved their delicately-feathered fronds. Conspicuous amongst this luxurious growth were specimens of the coral-lines or sea-firs, which a casual observer might easily suppose to be miniature fir trees, but which in reality are plants only in semblance. Each of these delicate looking plants is actually an animal; in fact, a colony of animals. Closely placed along each side of the stem and delicate branches of other growths are slight projections or nodules, each containing a separate animal, which it surprises one to learn is eventually destined to become a jelly fish. The benefits of this partnership between crab and coralline is probably mutual, but the advantage to the crab in being thus arrayed is easily seen, as he can remain completely concealed from his enemies, and be able to stalk his prey with greater certainty of success. Shakespeare, in his tragedy of “Macbeth,” caused an attacking force to advance under cover of a wood they had cut down for that purpose, but here in Nature’s own arena similar tactics are being pursued, and probably were ages before “Birnam Wood came to Dunsinane,” or any of the *genus homo* ever saw the light.

In the second instance, our attention was centred in a small jelly-fish swimming about in a quiet pool, its translucent body being scarcely distinguishable but for the beautiful flashes of iridescent light it was continually giving off in the bright sunshine. This beautiful object might, without exaggeration, be truly termed a living gem. Transferring it to a glass of sea water for a closer inspection, our curiosity was amply rewarded. In shape and size similar to a nutmeg, its body was divided by eight equidistant bands

running, as it were, from its North to its South Pole. Two long filamentous tentacles streamed from the lower portion of the animal, and were constantly being shot forth and withdrawn into its body, probably concerned in some way in the animal's nutrition. Along one side of each tentacle were ranged delicate filaments, scarcely perceptible to the naked eye, and were probably of service in entangling the minute food forms contained in the water. Each of the eight vertical bands was seen to be furnished with minute plates overlapping each other like the plume of a feather. These plates, being continually in motion, were the means by which the animal was propelled through the water; by reversing the action it moved backwards, and by moving those on one side only, a rotary motion was obtained, the action of the plates producing the most brilliant prismatic effects. Call these plates paddles, and their different movements a-head, a-stern, port and starboard, and man's wonderful invention the paddle-wheel does not appear so very "new under the sun." The various motions man obtains by means of ponderous machinery are here vested in this simple, almost structureless animal, which has aptly been likened to a drop of animated sea water, and the facility with which it rises to the surface or descends to any depth might furnish hints towards the solution of the submarine vessel, which is at present so engrossing the attention of naval authorities the world over. Dwellers by the sea at this season of the year should have little trouble in procuring specimens of this most beautiful and interesting animal, which would certainly prove to them "a thing of beauty and a joy for"—well, several days, if the water is renewed.

## *JULY 1901.*

EXCESSIVE heat, coupled with an unusual continuance of fog, have been the principle features of this month. The continual booming of our explosive fog-signal every five minutes, night and day, would be rather apt to "get on" a stranger's nerves were he compelled to sleep within a few feet of it; as a rule, it does not disturb us in the least, but with such protracted spells as we have had this month it does become a trifle irksome. The first shot generally sends the beads of some of the window cases rattling down the traps. This has a more disturbing effect on us when asleep than the actual shot itself, of which we are just dimly conscious.

The few boats which have been prosecuting the lobster fishing here for the last three months have now abandoned it. Although fairly successful at the commencement, they were latterly reduced to a mere pittance. A return of four lobsters for the hauling of fifty "sunks" is but a precarious living. Anchored close to the Rock, in order to avoid being run down by prowling trawlers, they often passed the night, sleeping underneath their sails. Their cooking range, consisting of an old metal pail with holes punched through the sides, set on a stone slab, while an empty meat tin did duty as kettle, fish-pan, or tea-pot, as occasion required. It is only within this year or two that the Rock has again attracted the attention of the lobster fisher, after a lapse of many years. Prior to that time, we could always rely on an occasional lobster being found in the holes on the Rock at low water; while crabs, which could be had in abundance, are now extremely scarce, and the lobster, as far as we are concerned, might well be as extinct as the Dodo. We had rather a surprising catch in a lobster-creel one time here. On hauling

our creel, instead of the expectant lobster a huge conger-eel was found in possession, his girth just barely admitting him through the "funnel." A further surprise, however, awaited us; for, on being cut open, a full-grown lobster was found in his stomach. How the biter in this case escaped being bitten is a mystery, as one would naturally suppose the lobster, with his powerful claws, would be more than his match. This recalls an incident which happened the other day. A pretty little fish, of a kind we had not yet seen, was, after some manœuvring, placed in a bucket of water along with some other fish, sea weeds, and shells. On examining our catch a little later, our pretty stranger was nowhere visible; suspicion falling on an ugly-looking little "poach" complacently resting at the bottom of the bucket, Jeddart justice was summarily meted out to the suspected cannibal; a post-mortem conclusively established his guilt. That these fish are cannibals there is not the slightest doubt. I picked up one about a foot long on a beach in Orkney, which had partly succeeded in swallowing, tail first, a brother half his size, but had been choked in the attempt; the horns on either side of his victim's head becoming embedded in his gullet, he could neither entertain nor reject him. Amongst the numerous *aliases* by which the "Poach" is known are the following—Bullhead, Hardhead, Cobbler, Shoemaker, Gunflucker, Comper, and Johnny Mainland, the latter being his Orcadian name.

The terns have increased to over a hundred this month; from daylight to dark their creaking voices are dinning in our ears. Most active little birds, they are almost continually on the wing, wheeling and diving with wonderful celerity. Their prey being surface-swimmers—chiefly herring-fry at present—necessitate a dive of only a few inches. The young birds, of which there is a goodly sprinkling, though almost as big as the parents, have not yet acquired the forked tail nor the pronounced plumage of the older birds. Awanting also in dexterity, they are being frequently fed by their parents. It is amusing to witness the chagrin of a youngster when, as

sometimes happens, an old one has mistaken it for its own offspring, and only discovers the error when about to drop the glistening prize into its gaping mouth. Woe to the gull who dares invade their sphere of operations when following a shoal of "fry"; he is soon put to rout at the point of the bayonet—for their bills are quite as sharp pointed. While stationed in Orkney I have, when in the vicinity of their nests, been "assaulted to the effusion of blood" as the police reports say, their bills easily penetrating my tweed cap. Horses and cattle are driven in mad flight before these bold little birds, they all the while pecking mercilessly till well clear of their nursery.

The pleasure steamers which formerly visited the Rock from Leith and Dundee have this summer scarcely made an appearance, possibly the attractions of the Glasgow Exhibition is the cause; as yet, only three visits have been made, and these from Dundee. An hour's fishing is generally given the passengers by the Dundee steamer. The diversity of tackle with which some of these amateur fishermen are equipped is fearful, and clock-weights, half-bricks, and scrap-iron of every conceivable shape take the place of the ordinary sinker. Closely ranged along the vessel's sides, one can imagine the result of lines so differently weighted, and should a fish be hooked confusion follows. If the sea happens to be a bit "choppy" many of them may be seen earnestly engaged in compulsorily contributing to the support of their erstwhile intended prey, each drawing his own line of demarcation down the vessel's side, as if suspicious of his neighbour encroaching on his territory.

## AUGUST 1901.

THE extreme heat prevalent in the earlier part of this month was characterised by a number of unusual visitors but ill adapted for any lengthened sojourn here. Butterflies, bees, wasps, and moths innumerable were to be seen flitting about the rocks in the daytime and clinging to the lantern at night, numbers of them being drowned every time the rocks were submerged. Several daddy-longlegs and a single specimen of the beautiful painted butterfly were seen among the ill-fated host. Why they should have journeyed to such inhospitable quarters is not very apparent, but possibly the steady westerly wind then blowing was responsible for their presence here, and, finding themselves unable to stem the current, like many other unfortunates, they followed the line of least resistance—then, *Facilis descensus Averni*, and there you are! We have frequent glimpses at present of an exportation of which the statute-books take no cognisance. Quantities of thistle-down are to be seen careering before the off-shore wind, probably with Norway for their future home. What a wonderful provision of Nature that enables these mute messengers of the fleeting summer to virtually wing their way to pastures new! suggestive in their silent flight of the

. . . whisper down the field,  
Where the year has shot her yield,  
And the ricks stand grey to the sun.

The sea in our vicinity is just now actually alive with shoals of immature fish, chiefly sand-eels, herring-fry, and what appears to us to be finger-long whittings. Incessant war is being continually waged upon them by the terns from above and the poddies from below. Watch this particular shoal of "fry" as it swims with the current past our door;

notice the orderliness which prevails amongst them, as of a disciplined army. But from below the poddlies have sighted them, and swift as light they are amongst them with a deadly rush. Completely disorganised, the "fry" scatter in every direction. Some seek shelter beneath the glassy domes of the passing jelly fishes; others, twisting and doubling like hares coursed by hounds, spurt spasmodically along the surface in their frantic endeavours to escape the enemies destined by nature for their destruction. The successful raiders are seen scurrying about, with their glistening prizes dangling from their mouths, dodging the thieving attacks of their less successful brethren in the foray. But suddenly a flash of bronze in the bright sunshine betokens the leap of the lordly lythe, as he in turn seizes his victim from amongst the attacking force and as quickly returns to his lurking-place among the luxuriant tangles. And so the war is waged, the strong preying upon the weak, right down the chain of life, till the unaided eye can but discern the destroyer alone. One is apt to experience a feeling of revulsion at the tactics pursued by the lythe in thus lurking concealed, while above him his prey sport in blissful ignorance of his presence. On the other hand, with what little compunction do we ourselves, by every available means, harry their numbers to supply our table, and a savoury dish they are at present; cooked when freshly caught they are simply delicious.

On Saturday the 10th we had a heavy thunderstorm; the lightning was extremely vivid, and appeared to zig-zag from the sea to the zenith, while the thunder, at first resembling the rippling discharge of small arms, gradually increased to the deep boom of heavy ordnance. The hitherto unbroken sea was threshed into white foam by the heaviest rain I have ever seen here. The poddlies, though busy amongst the "fry" at the time, would not deign to look at our "fly," and, though we tried our best, we did not succeed in hooking a single one. A similar result is experienced during the operation of our explosive fog-signal. As an instance how fish of the same kind may differ, there is a circular pool on the Rock at low

water, a couple of fathoms deep and about four fathoms in diameter, named Neill's Pool, but which we have jocularly nicknamed "the hospital," as the poddlies taken from there are, as a rule, extremely poor in flesh, often presenting queer abnormities. Some are twisted and deformed; others have constrictions upon their bodies, where at some period of their existence they had been almost cut in two by the snap of some larger fish, probably a lythe; others, again, have been taken with hooks embedded in their jaws and gills, and, though in the last stages of emaciation, do not apparently profit by their former experience. The full-grown lythe may be truly termed the poor man's salmon, not from a food point of view—though in itself not to be despised—but as a source of sport. Equipped with a rod such as fishermen use who fish for a living, and for a lure preferably a fresh-water eel about six or seven inches long, skinned from the "busking" downwards, a struggle with one of these lusty fish imparts most of the pleasurable sensations of the salmon fisher. Possibly at the first cast your lure is flipped clean out of the water by a vanishing tail, denoting that his lordship has not quite made up his mind about your invitation. However, your next cast is almost sure to be followed by a swift rush, which carries him well out of the water, and your lure is off to the bottom and possibly your tackle along with it, for, despite your triple gut, unless great care is exercised in the first few mad rushes, there will be a dissolution of partnership. Easily fagged, once you succeed in getting his head above the surface, a little judicious towing will land your two-foot bronzed beauty at your feet.

## SEPTEMBER 1901.

THE Rock has taken on quite a wintry appearance. The vegetation on the more exposed portions has entirely disappeared under the influence of the heavy seas experienced during the greater part of this month. The acorn barnacles with which the higher parts were encrusted are following suit owing to the ravages of the white whelk; the terns have deserted us, and, to complete the prospect, on the morning of the 19th we had the first visit of our winter boarders, the eider duck. A chip of rock covered with acorn barnacles becomes an interesting object when placed in the aquarium. Each conical shell is packed as close as possible to its neighbour, apex upwards. The apex is open, and fitted with a lid composed of four shells. Under water these lid-shells are seen to separate, and a bunch of "fingers" set on a stalk are thrust out, make a clutch, and are withdrawn. The "fingers" have extremely fine hair-like processes fixed at right angles to them, the whole forming a sort of net through which the water is filtered and the minute food-forms retained. It is interesting to know that although now fixed immovably to the rock these animals began life as free swimmers, and, strange to say, closely resembled the young crab. Another object we had under observation at the same time was one of the sea anemones, named the dahlia wartlet. A fleshy-looking disc studded with pieces of broken shell and sand, it appeared anything but attractive; but seen in the aquarium, the connection with its floral namesake was at once apparent. Unfolding itself from an orifice in the centre, as one would "flype" a stocking, rows of beautiful coloured tentacles were disclosed. These tentacles have the property of adhering to any object they come in contact with, and contain within

themselves some wonderful mechanism. Placing a fly on the extremity of one of the tentacles, it was immediately held fast. The whole of the tentacles then curled inwards, carrying the fly with them, thus clearly showing their function.

The heavy easterly surf has deprived us for the present of our fishing, forcing the fish off the rock to deeper water. There are evidently plenty about, as the gannets are to be seen busy diving in the vicinity. It is extremely interesting to watch these birds pursuing their prey. Flitting near the surface, they enter the water at an angle of about twenty degrees; again, at a higher altitude, they drop like a plummet, describing an arc of bubbling foam from their entrance to where they emerge with a bounce a few feet further ahead, beating the water with their wings for several yards before being again fairly on the wing. The air cells pervading various parts of the body of a bird, and which contribute to its buoyancy, are probably vested in a greater degree in the gannet, an extremely large one being situated in front of the forked bone, or clavicles. Several instances are recorded where a bird which had its windpipe temporarily obstructed was able, by means of these cells, to carry on the function of respiration through the wing bone, the broken end of which protruded through the skin. The voluntary compression of these cells, by expelling the air, destroys the buoyancy of the bird, and explains the amazing rapidity of its descent. An objectionable method is practised in some places for the capture of these birds. A submerged piece of planking with a herring fixed to its upper surface is set adrift, or towed from a boat, in the vicinity of their fishing grounds. Swooping from an altitude, say, of a hundred feet, they apparently see but the herring alone, with the result that their necks are dislocated by impact with the plank, the impetus of their descent being sometimes so great as to bury their bills to the base in the wood. It is a common sight here, during the breeding season, to see these birds trooping past in Indian file to their home on the Bass Rock, in batches of a dozen

or so, each preserving a regular distance from his neighbour. Though I have frequently watched them pursuing their vocation, I have never seen them bring their prey to the surface, nor could I say whether their dive was successful or not; but occasionally they emerge from their dive with a satisfied "honk," which may be translated "got 'im." Gifted with an insatiable appetite, they sometimes gorge themselves to such an extent as to be incapable of rising from the water, when they may be easily captured, as they make no attempt to dive. An instance of this was witnessed by a large crowd one Sunday, a few summers ago, in Arbroath Harbour. Some conception of the carrying capacity of these birds may be had when it is known that a sitting mother bird has been seen to insert her bill into the inviting mouth of her returned partner and deftly extract, one by one, as many as six full-grown herring.

A "false alarm" was occasioned at the end of last month by two cormorants or scarts appropriating the signal poles as a roosting-place. One of these poles is fixed on either side of the balcony, and projects horizontally. When a signal is made from the Rock, two-foot discs are suspended from them in pre-arranged positions. A wire stay from the balcony railing supports the extremity of each pole, and on this stay the birds were seated, one at the outer end, the other in the middle. Discs in this position, but pendant from the pole, by our code reads "Send boat," and this the keeper on shore duty in Arbroath construed it to be and acted accordingly, with the result that we were somewhat alarmed by the appearance of the harbour tug about eleven the same evening. Our impression was that something serious had happened on shore, and that one of our number was urgently wanted. On the tug hailing us, and saying they had been sent out in response to signals shown from the Rock that afternoon, our minds reverted to the birds, and our fears set at rest. Considerable alarm prevailed amongst our families, and not until the tug returned with the news that "All was well on the Rock" were their fears allayed.

On the morning of the 27th the sea round the Rock was seen to be strewn with apples, a few dozen of which we managed to secure. Their presence here is a mystery, and we trust has no connection with the long spell of fog we have had. On the 24th we completed a fusilade of forty hours, a record run of fog.

## OCTOBER 1901.

THE flock of eider ducks which keep us company through the winter increases daily, and now numbers over thirty. Swimming and diving amongst the breakers from daylight till dark, it is astonishing how they escape being smashed on the bare rocks. The receding wave may leave them almost stranded, and just as the incoming breaker is about to engulf them, they pop through its base and come up on the other side in a smother of foam. They are sometimes quite close to the tower, and then we have an interesting view of their proceedings. The diving of one is generally the signal for the remainder to follow, and the whole flock may be clearly seen, a couple of fathoms down, scurrying over the rocks in eager quest of the different dainties on their menu, consisting chiefly of small crabs. The capture of one of these crabs by no means ensures that it will ultimately contribute to the duck's sustenance—this is not intended as a reflection on their digestive power, which appears equal to anything short of nails, considering the quantity of hard-shelled crabs they assimilate during a day's fishing—for, on gaining the surface with his prize, he may be immediately assailed by the marauding gulls and compelled to dive with his prey. This may be repeated several times, until he reluctantly surrenders the succulent tit-bit, or is compelled to swallow it under water—a proceeding they are evidently averse to, otherwise the gulls would fare but poorly in their nefarious calling. The uncertainty of the crab's final lodgment is again demonstrated in the case of the successful "blackmailer." Hastily swallowing his booty to avoid being plundered in turn by his fellows, he is again on watch for the reappearance of his unwilling providers. But retribution occasionally overtakes the despoiler as it does his human prototype, with the difference that

in default of imprisonment, he is mulcted in the contents of his stomach, the nemesis in this case being the dusky-coated skua or robber gull, who with his hawk-like flight easily heads him at every turn, and the chase terminates only when the contents of the stomach are disgorged, or the excrement voided, either of which is adroitly caught by this foul free-booter of the sea before it reaches the water.

A hazy moonless night, with a sou'-easterly breeze and drizzling rain—given these conditions, at this season of the year we have numerous visits of various birds, members of the autumnal migratory flight. Making straight for the light, they dash themselves against the heavy plate-glass of the lantern; many of them are thus killed and swept by the wind into the sea. Others, again, arrive with more caution, and though taken in the hand and thrown clear of the tower invariably return, and remain fluttering against the glass till daylight reveals to them the futility of their exertions in that direction. The most numerous of these visitors are the red-wings and fieldfares, but blackbirds, larks, starlings, wheatears, finches, tits, etc., may be met with in the course of the season. It is somewhat startling, when on watch in the light-room, to hear the thud with which they strike. The woodcock, owing to his rapid flight, strikes hardest of all, and the other extreme is met with in the smallest of our British birds, the tiny gold-crested wren, whose presence on the lantern is announced by a feeble tinkling sound, which a robust butterfly might easily imitate. The heavier birds do not always strike with impunity; instances have occurred where ducks have gone clean through the lantern to the derangement of the revolving gear of the light, the splintered glass bringing the machinery to a dead stop. An incident of this nature happened a few years ago at Turnberry Lighthouse, on the Ayrshire coast, the intruder in this case being a curlew or whaup. A storm-pane is considered a necessary adjunct to every lightroom, and is always held in readiness to be shipped in case of such emergency. At some shore stations it is customary on the approach of a favourable night, during the

migratory period, to keep the cats indoors to prevent them mangling the expected catch. In one particular instance the birds collected of a morning filled an ordinary clothes-basket, and a few nights later included five wild geese, which were secured out of a large flock that came to grief on the dome.

An hour before daybreak on the 22nd it appeared as if we were about to suffer a bombardment, and that daylight was to witness the commencement of hostilities. No less than seven torpedo-boat destroyers were seen creeping close up to the Rock, their low black hulls scarcely discernible in the feeble light, and not until daylight disclosed the white ensign were we assured of their intentions. A little later they were joined by three gunboats and, after some clever manœuvring, formed into three lines, the gunboats occupying the centre. They then steamed away in the direction of the Firth of Forth. Two hours later other three gunboats passed us, going in the same direction, escorted by four destroyers, and followed shortly after by a solitary gunboat. Extremely interesting it was to witness the precision and dexterity of their movements as they swung into their respective positions for the advance, their semaphores all the while going like windmills. Again, on the 24th, about 11 a.m., a fleet of about a dozen battleships, headed by a dispatch boat, was seen moving in stately procession from the Tay, evidently bound for the Forth.

We have had several heliographic communications from our shore station in Arbroath during the month, and providing there is sunshine there is now no difficulty in transmitting messages to the Rock by this means. Four years ago the late Dr Russell, Arbroath, while on a professional visit to the shore station, for which he was medical attendant, witnessed our initial attempts in this direction, and, convinced of the feasibility of the method, urged upon us, in his characteristically vigorous style, the necessity for persevering in our attempts, at the same time predicting that it would ultimately prove successful. Little did we then dream it was soon to become the means of conveying the sorrowful intelligence of this estimable gentleman's death.

## NOVEMBER 1901.

BOISTEROUS weather prevailing for the greater part of this month, we have been closely confined to the house. Our connection with the amphibia being so extremely remote completely disqualifies us from enjoying our usual "constitutional," the grating, even at low water, being occasionally swept by the heavy seas. Our winter boarders, the eider ducks, have been reinforced, on the morning of the 14th—somewhat later than usual—by the arrival of a flock of long-tailed ducks. These, with the eiders, will keep us company till April again calls their attention to domestic affairs. Our relief, which was due on the night of the 11th, was effected just in time; had it been delayed another day a "missed relief" would probably have been recorded. The morning after brought a severe north-easterly gale, which precluded all possibility of making a landing during the three succeeding days. That is usually the time allotted by the steamer in the attempt. Should she fail to make a landing on the third day, we are abandoned for another fortnight, minus the time engaged in the attempt. As our stock of fresh provisions is generally consumed by the time the relief is due, a missed relief means a fortnight's *regime* of "hard tack" and "beef embalmed," of which during the winter months we have a three months' reserve stock on hand in case of such emergencies. Fortunately, this is not of common occurrence; during the past six years but three reliefs have been missed, and only one in the preceding ten. This speaks much for the ability and skill of those concerned in the handling of the boats, for during the winter months the landings were until recently effected in darkness, and an exciting scene it was to see the two boats buffeting their way through the foaming

channels, with jutting rocks so close on either side that an oar's length deviation would entail serious disaster. A powerful searchlight has of recent years been added to the equipment of the relieving steamer, and is of much advantage in the guidance of the boats, though it has the peculiarity of grossly exaggerating the tempestuous appearance of the sea. The sea, which on the evening of the relief was comparatively calm, was the next day rolling down on us like a solid wall, and viewed from the balcony in all its magnificent grandeur what a puny, frail, unstable structure our habitation seemed in comparison. Each succeeding wave seemed imbued with the sole motive of accomplishing our destruction, and as they struck and sliced away on either side in two mighty crescents of hissing foam, blinded our kitchen windows seventy feet above the rock. Clashing together again to leeward with a roar, as if incensed at our stubborn resistance, they drive their way furiously along the remaining portion of the reef in foam-capped ridges, and where the cross seas meet them the spray is flung high in the air from their points of intersection. The appearance of the reef at this stage, as seen from our elevation, is of a number of rectangular enclosures, each about the size of an ordinary bowling-green, with well-defined walls, the whole under a heavy coating of snow, with each corner marked by a snow-laden tree. At high water—the sea having flowed about twelve or fifteen feet on the building by that time—the waves, generally unbroken, slip past harmlessly; an hour before or after high water is when we experience the heaviest shocks, for then the depth of water is such that the waves are arrested by the rock when close to the tower, and their whole volume flung violently against the building. The effect of such weather on the tower must be felt to be understood. The nearest description I can give of the seas striking is as if a log of wood were hurled by each sea, striking end on, and a short, sharp, tremulous motion—sufficient to rattle the crockery in the kitchen cupboard—is imparted to the tower by each impact. This tremor is more particularly felt when the gale subsides and the heavy swell sets in, for when

the gale is at its height, the seas are so broken and tossed about that their assaults are but feeble in comparison with those of the long curly-headed combers of the after-swell. The bell-shaped formation of the base of the tower is admirably adapted for withstanding the assaults of the sea, and is built solid to a height of thirty feet, above which the seas never strike, though I have seen the spray carried right over our balcony, a hundred feet from the rock. That the building remains to all appearance as intact as when completed, almost a century ago, speaks volumes for the skill and ingenuity displayed in its erection. In weather such as I have described we are as completely cut off from outside assistance as though we were at the North Pole; indeed, it is doubtful if there is another situation—save similar ones, of course—where men could live so comfortable and unconcerned and yet remain for the time being so completely “ungetatable.”

## DECEMBER 1901.

As a consequence of the stormy weather which has been prevailing here of late, we have been visited by numerous "Travellers." This may seem strange considering the inclemency of the season, but stranger still when it is known that our reception of them is fiercely hostile, and our duty only considered accomplished when we have completely annihilated them. Huge boulders of hard red sandstone, sometimes weighing over three tons; these are our "Travelers," and their appearance on the Rock is at once resented and their speedy removal effected by blasting and hammering whenever the tide and weather permits. This is absolutely necessary, for if allowed to remain lying in the boat tracks they constitute a serious danger at relief times, besides the possibility of their carrying away portions of our cast-iron grating, which occasionally does happen in spite of all precautions. Where they come from is a mystery; ever since the tower was built they have been in evidence. Although composed of the same material, the Rock itself does not suffer any apparent diminution, nor can their original abode be located even at the lowest tides. Many of them carry a crop of seaweed and tangles, and have their angularities rubbed down and water-worn; none of them, however, bear any trace of recent detachment, but probably from their similarity of structure they at some remote period formed a part of the reef. They generally effect their entrance from the south side of the reef during the prevalence of a heavy ground swell. This side of the reef forms a steep declivity, sloping to 35 fathoms at a distance of  $\frac{3}{4}$  mile, while at a similar distance on the north side the depth, though not exceeding 11 fathoms, presents a more precipitous barrier to these wanderers of the deep. A dull, rumbling noise, distinctly audible in the light room, announces their presence at the

base of the tower, and at low water a dotted line of chips and abrasions marks their passage across the Rock to where they are again hurled to the depths. Others, again, may bring up in some sheltered corner, where, if not considered dangerous, they may remain a fixture for years.

An instance occurred recently where one was wheeled against our grating after occupying a safe position for many years. Those that take up positions in the boat tracks are of course assailed at the earliest opportunity, an operation which generally entails a bit of submarine mining on our part. The reef consists of hard, red sandstone, arranged in irregular layers, with a dip of 15 degrees towards the south-east and extends in a north-easterly and south-westerly direction, having an area of about 500 yards by 100 yards considered dangerous to shipping. The north-east end, on which the Lighthouse is built, is slightly higher, and has an area of about 140 yards by 70 yards, the highest portions of which do not exceed 10 feet above the lowest tides. The geological formation of the Bell Rock is similar to that of the Redhead, in Forfarshire, and can be traced northward through Ross-shire, while in the opposite direction the shores of Berwick present the same features, and continues as far as Cumberland. Soundings prove the existence of a ridge or shallower part of the sea bottom extending a considerable way in these directions, and as the adjacent coasts present ample evidence of the sea having at some remote period in the world's history occupied a much higher level, the theory that the Bell Rock did not always occupy the isolated position it now does, but stretched continuously from the Red Head to Berwick, damming the waters of the Forth and Tay, appears highly tenable. Possibly our present day "Travellers" are, through some great seismic disturbance, wandering evidences supporting this theory.

An item of interest to Arbroath Freemasons is the laying of the foundation stone of the Bell Rock Lighthouse, on the 10th July 1808, with Masonic honours, by the builder, Robert Stevenson, who, in his own words, applied the square, the level,

and the mallet, and pronounced the following benediction:—"May the Great Architect of the Universe complete and bless this building," on which three hearty cheers were given and success to the future operations was drunk with the greatest enthusiasm. Another interesting feature of that period was the existence of the "Pressgang," which, owing to our war with the Northern Powers, was considered necessary. Centres were established at Dundee, Aberdeen, and Arbroath, and were the means of rendering the Lighthouse operations popular with seamen, as they stood protected from impressment while in that employment. Prior to this there was a tendency among seamen to shun the works on account of the hazardous nature of the undertaking. As the impress officers were exceedingly active in their duty, it was found necessary to furnish each seaman engaged in the operations at the Rock with a "ticket," descriptive of his person, to which was attached a silver medal, emblematical of the Lighthouse Service. On one side of the medal was a figure of the Bell Rock Lighthouse, and on the other the word "Medal," referring to the Admiralty protection, and a description of the person by the engineer. One of these medals is at present in possession of an Arbroath gentleman, and is said to be the only one in existence. The following is a copy of one of the "tickets," taken from "Stevenson's Bell Rock Lighthouse":—

BELL ROCK WORKYARD,  
Arbroath, 31st March 1808.

"John Pratt, seaman, in the service of the Honourable the Commissioners of the Northern Lighthouses, aged 35 years, 5 feet 8 inches high, black complexion, and slightly marked with the smallpox."

(Signed) ROBERT STEVENSON,  
Engineer for Northern Lighthouses.

*Obverse.*

"The Bearer, John Pratt, is serving on board of the 'Sir Joseph Banks' tender and craft, employed at the erection of the Bell Rock Lighthouse."

The signature of the Master of the tender.

(Signed) DAVID TAYLOR.

The signature of the bearer (Signed) JOHN PRATT.

Notwithstanding these precautions, so rigorous were the impress officers that they actually pressed a Bell Rock seaman named George Dall, while on a visit to some friends near Dundee, in July 1810, and this despite the fact of his having the protection medal and ticket in his possession. These proofs the officer chose to ignore, holding that a seaman only stood protected on board the ship to which the Admiralty protection had been granted, or in a boat belonging to the ship. This was absurd, as it was impossible for each man to carry the ship's protection with him. However, Dall was kept a prisoner, and only on the representations of the Lighthouse Commissioners did the Dundee Magistrates order his release.

### *JANUARY 1902.*

A RAMBLE round the rocks at low water just now discloses a scene of bareness quite in keeping with the season of the year. The upper surface of the higher lying rocks is as bare as a street pavement, and only an occasional patch of acorn barnacles remains of the encrustation with which they were invested during the summer. The white whelk, so much in evidence here, have all gone into winter quarters, and underneath projecting ledges and in sheltered nooks they may be seen in myriads, their position being so judiciously chosen as to be completely protected from the heavy north-east seas. So closely are they wedged together that were a given space to be cleared it would be found almost impossible to replace them in the same area. Detaching one from its anchorage, it seems quite dormant and inert, and appears to have lost the alacrity with which, in summer, they withdraw themselves into their shells, and only with apparent difficulty is the operculum or door of their domicile closed against intruders. To witness the continual thumping and pounding to which the Rock is subjected during the winter, one is surprised to find that life in any form should continue to exist under such conditions. A close search reveals exceedingly minute forms of life. Here in this stony basin, originally but a shallow depression in which a stone had lodged, and by the swirling action of the seas converted to its present shape, with its sediment of broken shells, is a small crab, so small indeed that a split pea might easily conceal him. He is not a youngster either, but fully adult, in proof of which we have frequently found them, in the proper season, with their spawn attached. Deep in his little pit he seems quite immune from the furious seas that tumble overhead as the tide makes. Numbers of

small white-banded whelks, which one may easily crush between the fingers, maintain their position on the base of the tower, despite the constant swirl of waters, though they may be detached with a flick of the finger.

Vegetation now exists only at low-water mark; above that, broken tangle roots, or, to be more correct, the claspers are seen still adhering to the rocks, the tangles themselves having been shorn clean from their moorings. Away towards the south-west, in the deeper water, a boat may float among whole groves of storm-torn tangles as they flaunt their tattered banners in the frosty sunlight, suggestive of leafless trees in a winter landscape. Over the recently emptied contents of the cook's slop-pail a flock of gulls are circling and screaming, actually hustling each other in their attempts to capture anything edible. A solitary "black-back" is seen amongst the noisy crowd, and as he swoops at some tempting morsel, his black, beady eye watches our every movement with suspicion. What a handsome bird he is as he swings past within a few feet of us, the back and wings presenting a dead black appearance in startling contrast with the immaculate whiteness of the fan-shaped tail and the remainder of the body. Despite his handsome appearance, he is a veritable vulture, and nothing comes amiss to him in the way of food, be it fish, flesh or fowl. Frequently I have seen them make a meal of a wounded duck, and once witnessed in Orkney a tug-of-war between two of them for the possession of a dead lamb, resulting, thanks to its decomposed state, in an equal division.

More gruesome meals are credited to them by those who have witnessed their proceedings on a wreck strewn shore where loss of life had been involved. A terror also on the grouse moors, they devour both eggs and young, and even the sitting grouse herself is not safe from him. One can scarcely credit such a sweeping indictment against this handsome bird, but the proofs are all too plain. Consequently we find him outside the pale of the Wild Birds Protection Act, an Ishmael among his kind, whom any man may slay when and wherever found. Except when harrying the eider ducks of their

legitimate spoil, he may be seen riding gracefully, head to wind, in front of our kitchen window, with his weather eye always lifting in our direction. A hand thrust from the window is sufficient invitation, he is up at once, and the smallest morsel tossing among the foaming breakers does not escape his keen eye. How gracefully he floats back to his former position, lighting on the surface like a fleck of foam. What a contrast to the eiders, who, when changing their fishing ground, wing their way with such rapid wing beats as to give one the impression that they are barely able to support themselves, and finally strike the water with an awkward splash, reminding one of the somewhat inelegant term with which boys designate a bad dive—a “gutser.” Should a flock of eiders be fishing to leeward of the tower, an amusing sight may be witnessed if advantage be taken, while they are under water, of pouring a little paraffin oil from the balcony, so that it will drift in their direction. No sooner does the head of the first emerge in the greasy track of the oil than he is conscious of something unusual having taken place. Flippering hither and thither with outstretched neck, he becomes quite excited, and each as he bounces to the surface joins in the commotion, frequently colliding with each other. Finally, with loud cacklings, the whole flock takes wing, evidently in high dudgeon at the insult offered to their olfactory organs.

Sea pheasant is the name by which the long tailed duck is known in some localities, and as we watch a flock of them crossing the reef in full flight the synonym is at once apparent. In style of flight and shape, to the long tail feathers, they are similar to the pheasant, but only half the size, with beautiful plumage of black and white. Here they are known as “candlewicks,” their call notes needing but little stretch of the imagination to be rendered “Here’s a candlewick,” repeated several times in shrill falsetto, which on a quiet day becomes somewhat annoying as it clamorously floats through our bedroom window. Some queer visitors we have here at times in the way of birds. Once we captured a large owl dosing sleepily in one of our windows. During the week of

his captivity he would not deign to partake of any food we offered him. Coming off watch one night I took one of a flock of larks which were making suicidal attempts to pierce the plate glass of the lantern. Placing it in the room where the owl was roosting, it fluttered to the window, when, like a flash of lightning and equally as noiseless, from the other side of the room the owl came crash against the glass, a few feathers later on testifying his appreciation of this form of dietary.

## FEBRUARY 1902.

PIERCING cold weather here of late, with a good deal of frost and occasional snow showers. No matter how heavy the snowfall may be here we only see it falling, as it does not lie long round *our* doors, and only when our gaze is directed Arbroathwards—which, you may be sure, is not seldom—are we reminded of its occurrence. The close of last month saw our barometer taxed to its utmost intelligence, and though a tenth higher would have seen its limit, nothing of a phenomenal nature was noted. The solan geese or gannets, which are pretty much in evidence here during the breeding season, foraging for their families on the Bass Rock, gradually disappeared, till during the month of November not one was to be seen. A solitary one was seen in the first week of December, and since then the number sighted has gradually increased, till in the middle of the present month, as many as eight in one string were counted winging their way southward. The Bass Rock, Ailsa Craig, and the outlying stacks of lonely St Kilda, are said to be the only breeding places of these birds in Scotland. At the beginning of the past century they were considered a dainty article of food by the Edinburgh gentry, and the Bass Rock was rented for the purpose of supplying the market, the birds selling at the rate of half-a-crown a-piece. I have seen it stated that the *modus operandi* of these birds when engaged in fishing is to flit along the surface till fish are sighted, when they rise to a high altitude, close their wings, and drop hawk-like on their prey. This, I venture to think, is scarcely correct. My experience is that when flitting near the surface if fish are sighted they are invariably struck at without rising to a higher elevation. It is a well known fact that objects under water are more easily

distinguished from a height than from near the surface, so that it may be taken for granted that the higher these birds are flying when in pursuit of prey the deeper the fish are swimming. Again, when diving from a high altitude, the wings are kept rigidly outspread, and as the tail is never seen spread rudder-like, as in the case of the hawk, any deviation from their line of descent is controlled by the long narrow wings, and only when nearing the "plunge" are they partially closed.

For the past fortnight we have had the company of a solitary seal. His fishing does not seem to be very successful, either in quantity or quality, as the only catch we have seen him negotiating was a saithe the length of a man's forearm. Playing with it as a cat would a mouse, he would allow it to swim feebly for some distance, then diving he would bring it to the surface, till latterly, with a toss of his head and a thrust with his fore flipper, he quite disembowelled it, an act of charity which the screaming gulls were not slow to appreciate. Although so long here he has not been seen to rest on the rocks; indeed, I only once saw one ashore here, and as we had a somewhat amusing experience with him it will perhaps bear relating. For several days it was seen, as the tide fell, to rest in one particular place a few yards from the base of the tower. Our outer door opens outwards, and is always closed at night, not that we are afraid of burglars, but merely to prevent the entrance of the seas, and for our own general comfort. The opening of this door always alarmed the seal, and sent him into the water *instantly*. Dropping a line from the balcony at low water, we made the end of it fast within a few feet of his accustomed resting place. Next day, as the tide fell and the rocks began to appear, he was seen to take up his former position, yawning lazily as he rolled from side to side in the sunshine. Fixing a four ounce charge of tonite to our electric cable, we quietly lowered it down the line we had already made fast till within about six feet from where he lay, apparently in blissful ignorance of what was happening overhead. When yawning at his widest, we, by means of our

magneto-exploder, fired the charge, and, well—he stopped yawning and went away! and his going was about the smartest thing I ever witnessed. The force of the explosion, being unconfined, merely tilted him on his side, but quickly recovering himself he flopped into the water and shot seaward through the gully like a flash, a black line under water denoting his course. Rounding the outer end of the gully, he doubled back on the outside of the reef, and when opposite his original position, made his appearance on the surface, a very much startled seal. His aspect was quite comical as he stood, so to speak, on his tip-toes evidently investigating the cause of his hurried departure.

Several schools of porpoises have been seen this month, presumably in pursuit of herring. To anyone who has seen these animals gambolling in front of a ship's bows when travelling at her best, the ease with which they maintain their distance is a matter of surprise—always on the point of being run down, but ever ahead, snorting playfully as if in derision at the possibility of their being overtaken by their lumbering follower. Off the island of Anticosta, in the Gulf of St Lawrence—where these animals attain a size several times larger than those of our home waters, and are of a cream colour—I had an interesting view of their manner of suckling their young. I have seen it stated that the mother by muscular compression expels the nutritive fluid, which is absorbed by the young one as it floats to the surface. The operation appeared to me to be one of actual contact. The young one—which, by the way, is of a slatey-blue colour—snuggling as close as possible to the mother as she lay somewhat on her side on the surface, all the while exhibiting the tenderest solicitude for her offspring. Truly the one touch of nature which makes the whole world kin. It is surprising to learn the evolution these animals have undergone in order to accommodate themselves to their altered circumstances. Land-dwellers at one stage of the world's history, but acquiring a taste for fish, they gradually became aquatic in their habits, dispensing with such portions of their anatomy as were no

longer necessary, while developing others more appropriate to their new sphere of existence, till, like their big brother the whale, from being a four-footed animal they became quite fish like in appearance, even to the cultivation of a dorsal fin, though still possessing rudimentary traces of their former construction. Change is apparent on every hand in the plan of nature ; ages were necessary for the evolution of our present day horse from his five toed ancestors ; and after all it does not seem so very startling when the transformation is enacted before our very eyes in a few short stages, as in the case of the common frog, from the gill breathing tadpole to the lung breathing adult. More startling it is to learn that man himself was at one time a gill breather, and, as biologists affirm, still exhibits traces of gill clefts at one stage of his embryonic development.

### *MARCH 1902.*

SIGNS of uneasiness and unrest are now apparent amongst our winter boarders, the eiders and long-tailed ducks. Taking wing on the slightest provocation, they wheel aimlessly round the Rock, and instead of their usual steady persistence in diving for a living, they seem quite discontented with their lot, and plainly making up their minds to desert us for the summer. Advances by the males are as yet met with scornful rebuffs by their less showy plumaged partners, but soon a mutual understanding will be arrived at, and before the month closes they will have gone house-hunting, eiders possibly to the Isle of May, while the long-tails, being migratory, seek their homes in the frozen North. It seems a strange anomaly that the less robust looking longtail should choose such rigorous latitudes for the rearing of its brood, while the sturdy "dunter," swathed in his arctic coat, should elect to stay at home. On the other hand, we have been visited on hazy nights by numbers of larks and thrushes returning to our shores, after wintering in "Norroway ower the faem." These members of the spring migratory movement often come to grief on our lantern, and when one considers the number of lighthouses round our coasts, it will be understood that the death-roll from this cause alone must be extremely high. Designed to save life, we unwittingly lure our feathered friends to their destruction.

A couple of seals have been sporting round our door of late, and they also exhibit signs of exuberance in keeping with the season. At high water they come quite close to the tower, and their antics are seen to advantage from our balcony. Rolling over each other, they make for the bottom, gliding along the rocks like hounds hunting in couples; then

with a rush they are on the surface, floating bolt upright, with their muzzles almost touching, staring with their large, expressive eyes into each other's face. An almost human touch was given to their play by one taking the head of the other between his fore-flippers, as if about to salute him, or more likely her, in the orthodox fashion. One was seen the other morning in possession of a large fish, while a number of gulls sat at a safe distance round him, waiting for the fragments when the feast should begin. By the way he glared at them, he was evidently annoyed at their presence. Sinking for a few seconds, he appeared on the surface minus the fish. This was evidently intended as a ruse, and meant to imply that he had lost it; but the gulls seemed to know better, and kept their position. Diving, he made his appearance some distance off, this time with the fish in his mouth, only to find himself, to his annoyance, again the centre of wistful expectations. Presuming these gulls to be up-to-date birds, their exulting cacklings might be literally rendered—"You better begin, Mister Phoca; it's no use trying, you know; you can't possibly dewett us!" At least, the seal seemed to think so, for he there and then opened the banquet with a rip of his teeth that distributed the offal amongst the hungry cordon.

The rocks become at this season of the year invested with a slippery coating of algæ, which renders it extremely difficult to maintain one's footing, and also necessitates repeated applications of hot lime to our gratings in order to render them passable. Myriads of minute whelks, no larger than turnip seed, strew the rocks and crunch under foot as we walk, while great patches of mussel spawn delight the heart of the more venturesome of the white whelks—a prospecting party who will doubtless communicate the promising state of the commissariat to their fellows still in winter quarters.

Fishing in the Rock pools has been tried for the first time this season, and resulted in the capture of a solitary "cobbler." It may be a month hence before we meet with any success.

This month has been extremely mild, though the hills

behind Arbroath are still seen to carry portions of their winter coat, while the higher ranges inland are completely snow-capped. On a clear day our view is limited by Tod Head, about twenty-five miles to the north, and St Abb's Head thirty miles south of us. The coast-line presents a uniform flatness, which becomes monotonous in comparison with the more picturesque raggedness of the West Coast. A most conspicuous feature in the landscape in the vicinity of Arbroath is the clump of trees on the summit of the Law Hill—a landmark well known to navigators, and easily discernible, as it stands sharply defined against the sky-line. Arbroath, when not enveloped in smoke, is clearly seen, and with the aid of our telescope the after-church promenaders can be distinguished on the Protection Wall, or wending their way towards the Victoria Park.

*APRIL 1902.*

THE extremely low tides prevalent at the opening of the month enabled us to extend our hunting grounds somewhat further than usual, and also to reach and demolish several "travellers" which the heavy seas had hurled into the boat tracks, thus constituting a serious danger at relief times. Quite a forest of luxuriant tangles now cover the lower lying portion of the reef. Their dripping blades appear on the surface, scintillating in the brilliant sunshine like so many diamonds, till the receding tide permits the warm sun to rob them of their freshness, their beauty vanishing in a perceptible vapour, leaving them flaccid and inert till the returning tide restores their pristine beauty. The badderlock or henware is here also in great profusion, and usually selects a position the reverse of peaceful, being generally found where the wash of the seas is most constant. Of rapid growth, they attain a great length, some measuring fully sixteen feet; one we had under observation was seen to increase a foot in length in six weeks time. Owing to hazy weather we had a number of compulsory visitors to dinner yesterday. Seated outside our kitchen window was a party of fog-bound travellers, consisting of a pigeon, a starling, a wagtail, a robin, and a couple of wheatears. The starling was sitting bunched up by himself, preserving a stolid indifference at his enforced detention, and appeared to treat the animated expansion and flirting of the wheatears' tails as undue levity, unbecoming their sorrowful predicament. The beautiful black-throated wagtail is all alertness, and the slightest movement on our part sends him circling round the Rock till, unable to sight the land, he is fain to regain his resting place. The pigeon has been here a week now, and

evidently has no intention of leaving. Should the window be left open he makes bold enough to enter, although but the other day he gave us a somewhat dramatic illustration of the proverbial hen on the hot "griddle" by rehearsing a fandango on the top of our cooking range, a position from which he had to be forcibly removed. To-day, the 21st, he has been joined by a companion of his own species, a red-chequered homer; but instead of the mutual demonstrations of pleasure one would expect to witness at their meeting in such isolation, they remained quite indifferent to each other's presence, the newcomer possibly from motives of disdain, as he appears to belong to the aristocracy, seeing he sports an aluminium bracelet, on which are the letters "U.B." and the year 1901, besides a number composed of three figures, which, unfortunately, I took no note of. A strong southerly breeze on the 22nd deprived us of their company. Losing the shelter of the tower, they were unable to make headway against the wind, and, fortunately for themselves, were driven landwards.

On the 20th a small patch of paidle-fish spawn was seen cemented in a sheltered nook of the rocks. This is unusually early for nesting operations, as it is generally May before they are much in evidence here. The extremely small quantity may denote a change of mind on the part of the depositor; besides, the site is badly chosen, as the nest is a couple of feet above low water, and consequently without the cock's guardianship for some time each tide. Possibly the heavy seas prevalent during the past fortnight may have warned the builder of being somewhat premature in her operations.

We had ocular demonstration the other day concerning a matter of which doubts have been expressed, namely, the skinning of their prey by seals. Not only do they skin their fish, but each shred of skin is greedily swallowed as soon as stripped. The skinning entails a good deal of trouble, as the fish is pushed away from the seal at every mouthful, and consequently sinks, so that a dive is necessary each time in order to resume operations. Why he should take all this trouble is not apparent, but presumably he understands his own

business best. His operations at present are watched by us with longing eyes, for though he appears to have all he wants we are as yet fishless. However, the presence of the paidle spawn is a hopeful sign, and is the first attraction for the wandering cod, by whom it is greedily devoured, providing they can steal a march on the red-coated sentry—a difficult matter, one would think, considering how assiduous he is in the protection of his charge. The white whelks, presumably adopting the promising report of the reconnoitring party sent out last month, have turned out *en masse*, and are now waging a one-sided war of extermination upon the defenceless mussels.

The times change and we change with them. Our present light is doomed, and what the assaults of almost a century's gales have failed to accomplish will succumb to the demands of modern innovation. Doubtless, the presiding genius of the reef will be congratulating himself, as he bares his head each tide to witness the process of demolition, on the return of the palmy days when as yet no meddling light interfered with the working of his own sweet will in dealing death and destruction to many a stout ship. Happily, this view is only apparent, for by early autumn a much more powerful light will be installed, and a new lease of life granted to the grand old building which has so effectively served the maritime world since 1811. Probably but few on shore noticed the first appearance of the temporary light on the evening of the 30th. Of weaker power, but presenting similar characteristics as the future light, namely, red and white flashes alternately, with an interval of thirty seconds between each flash, it will remain in use till ousted by its more powerful successor.

## MAY 1902.

DECEMBER in May fitly describes the prevailing state of the weather during this month. Chilling winds, accompanied by snow, hail, or sleet showers, engender doubts as to the veracity of the calendar, but the arrival of a number of terns on the 18th dispels all doubts upon the matter. Sojourning in Africa since their departure in September, they invariably make their appearance here in May. At present there are about thirty of these energetic little birds busy diving among the breakers, picking up small fry, among which is seen inch long sand eels. A flock of kittiwake gulls also hunt alongside of them, while several gannets are to be seen further off, plunging in pursuit of larger game. Clustered in sheltering nooks of the rock are numerous patches of ova, deposited by the white whelk. Closely resembling ears of wheat in size and shape, each is attached to the rock by a short footstalk, terminating in a flattened disc. On being pressed, a milky fluid, somewhat granular, is exuded from the free end. The whelks themselves are at present feasting on limpets, whose shells have been fractured by the debris consequent on the alterations in progress, though at other times they do not appear to attack the limpets, their thick shells possibly making the game not worth the candle.

Despite the inclemency of the weather, the work in connection with the alterations is being rapidly pushed forward. The removal of the old lantern and parapet wall turned out a more laborious undertaking than the erection of the new ones. Strength and stability were the outstanding features of the old erection, and were carried to such an extent as would probably be considered superfluous in these days. The stone parapet wall would in itself be an eye-opener

to our modern jerrybuilders. Octagonal outside, circular within, the wall was composed of five courses of Craigleith freestone, each course feathered and grooved, while each stone dovetailed its entire depth into its neighbour. At each point of the octagon holes were drilled from top to bottom of the wall to receive the two inch iron bolts which secured the heavy cast iron lantern to the parapet. It was necessary to reduce the stones to fragments before hurling them into the sea, in order to prevent them obstructing the boat tracks or damaging the gratings. Between the outer and inner linings of the copper dome a scrap of newspaper was found wrapped round what appeared to be a file handle. The printed matter was quite legible, and bore reference to an unfortunate episode, happily long since relegated to the realms of oblivion, namely, the investigation into the conduct of the then Princess of Wales in 1806. In one of the ventilators which pierced the parapet wall on a level with the balcony, but long since disused, a perfectly desiccated specimen of a wren was found. Attracted probably by the light while on a migratory journey, it had evidently taken shelter in the ventilating tube just prior to its being plugged up with a wad of tow, a material which for many years has been superseded throughout the service by cotton waste.

The ping-pong craze has come our length, and in imitation of other manlier sports a trophy has been instituted for competition, the said trophy to become the property of the holder after being won thirteen consecutive times. The trophy takes the form of a handsome cup of silver, or, to be more explicit, of a metal usually found in conjunction with silver, and is quite Grecian in its simplicity of design. It is considered to be of foreign origin, and bears evidence of having at one time been profusely chased and engraved. A beautiful pastoral scene is depicted on the one side, while, on the other, two foreign words are barely decipherable, namely, "Lait Concentré." The trophy generally graces our tea table for some time prior to the competition, and materially aids in stimulating the flagging energies of the competitors.

## *JUNE 1902.*

ONLY towards the end of this month did we experience anything like summer weather. Believing the wintry weather we had been experiencing, the fragrant odour of the hawthorn blossom borne on the off-shore wind imparts a pleasurable sensation, recalling scenes of earlier days when void of care we went "flourish" gathering, or later on disported ourselves amongst the "hips and haws." Here, no sylvan scenery greets the tired eye nor gives respite to the senses from the everlasting waste of waters, with its ever-changing moods, from placid glassy calm to the wildest turbulence, when blustering Boreas drives his team amain, and the white-maned coursers charge down upon us like an avalanche. As the tide drops, and the long lush tangles trail their tattered tops on the surface, a dank heavy odour is perceptible, scarcely so pleasing to the senses as that of the "hawthorn bud that opes in the month of May." Equipped with a stout stick bearing an iron hook, an hour's crab-hunting among the rocks brings one into contact with many forms of life otherwise unnoticed. Groping underneath a projecting ledge, to ascertain if the inmate is at home, the eye is arrested by minute nodules of scarlet jelly pendant from the roof, and destined to become a close imitation of their terrestrial namesake the anemone, or, in similar situations, patches of white whelk ova appear like so many grains of wheat arranged as close as possible to each other.

Recently a solitary instance was noticed of a whelk carrying the ova attached to the exterior of its own shell. Many different species of whelks are thus met with, some scarcely distinguishable by the naked eye. The intrusion of the crabstick soon betrays the presence of the crab. Gripping the

"cleek" in his claws, he prepares for resistance by forcing his back against the roof of his domicile with all the power his crooked legs are capable of. Should he feel himself being drawn he immediately releases his grip, and, if possible, "seeks his benmost bore." Should the cleek find a favourable hold, such as under the armpit, so to speak, he is soon dislodged, but if the hole be somewhat crooked it is extremely difficult to move him, and even then he may make his appearance in sections, as he parts company with the different members of his body on the slightest provocation, a proceeding about which he has but little compunction, as he knows well others will soon sprout in their places, a convenience which Nature might with advantage have extended to the *genus homo*. Poachers, it is stated, have made use of these crustaceans while "ferretting" rabbits, by sending them into the burrows with a stump of lighted candle stuck on their backs. One can fancy the surprise with which "bunny" would stand aghast at such a fearful apparition.

Scarcely a bird is to be seen in our vicinity at present, nesting operations calling them elsewhere. A few foraging gannets are seen daily passing and repassing, catering for their sitting mates on the Bass Rock. The terns and gulls will probably have their wants supplied from the shores in the neighbourhood of their nurseries. The nest of the tern is of the simplest description—a slight depression on a gravelly beach or grassy mound, or even the bare surface of a rock is considered sufficient for their purpose, nest-building, in their estimation, being evidently considered superfluous. It is surprising that the eggs remain in some of the positions in which they are deposited. I have frequently set them rolling along the rock surface by the action of my breath. On their exit from the egg the young are immediately led by the parents to a shingly beach, or other place of concealment, where it is extremely difficult to detect them from their surroundings. Here they are fed with sand-eels and other small fry till such time as they are able to wing their way to the fishing grounds themselves, though even then they

are frequently the recipients of the parents' generosity, their hunting powers being as yet inadequate to supply their needs.

The work in connection with the alterations here progresses rapidly, and by the end of next month it is expected but little will be left undone. To all external appearance the work is already finished, but the building of the huge lens and revolving machinery, along with the internal fittings, have yet to be completed.

### *JULY 1902.*

MYRIADS of medusae or jellyfishes are constantly streaming past our door, apparently without any powers of volition of their own, but helplessly at the mercy of the tides. Of various sizes, shapes, and colours, they impart quite a gay appearance to the seascape, somewhat resembling a grassy sward carpeted with beautiful flowers—huge sunflowers predominating—the whole moving silently just beneath the green, glassy surface. Great tremulous discs, twelve inches in diameter, trail their streaming tentacles several feet behind them; others, again, no larger than a pea possess the power of radiating, from the ciliary bands with which they are furnished, all the colours of the rainbow. Stranded high and dry, what a contrast to their former glory, now an inert mass of slobbery mucilage. At one period of their existence they appear quite plant-like in their habits. Attached to the rocks, they closely resemble miniature fir trees, each plant ultimately producing whole colonies of juvenile medusae. Fish have been fairly plentiful this month, but owing to the work at present in progress we have but little time to avail ourselves of the opportunity. On the 6th a red chequered pigeon, stamped "J. B. Sollaway, Beeston," on wing, was released after a night's detention. On Saturday the 12th, other two pigeons were captured at 8.30 p.m. One a red chequered homer, with aluminium ring on leg marked N.U. 01, H.A. 587, also rubber racing ring on other leg, marked 132 outside and 263 Q inside; the other a blue chequered homer, with leg ring marked N.U. 99, C. 8953, and racing ring marked Q 513 inside and 174 outside; wing feathers stamped "Walter H. Walker, Bank House, Horsforth, Leeds." Both pigeons, after being watered and fed, were released at 11 a.m. on 13th, each steering a sou'-westerly course from the Rock.

On the evening of Sunday the 27th our new light was exhibited for the first time, the coveted honour of "first light" falling in the ordinary routine of duty to the writer. The new apparatus—a bewildering arrangement of massive glass prisms—is in striking contrast with its predecessor, the old reflector system of lighting, a system, by the way, now almost obsolete. The following description of the new light is copied from an engraved plate affixed to the new apparatus:—"Combined hyper-radiant and 1st order apparatus, with equiangular dioptric elements and catadioptric back prisms; power of red flash and white flash equalised. White and red flashing light, showing white and red flashes alternately every half minute, the period being one minute. Designed by Messrs Stevenson, Civil Engineers, Edinburgh. Contractors, Messrs Steven & Struthers, Glasgow, and Messrs Société Des Etablissements Henry Lepaute, Paris. David A. Stevenson, Engineer to the Board. Apparatus makes one revolution in one minute—1901."

Occasionally during the progress of the alterations our population, unlike that of Arbroath, increased to a somewhat alarming extent, mounting at times to a grand total of seven all told. Considering that the majority of the population were unaccustomed to life under such "cribbed, cabined, and confined" conditions, it was surprising to witness the cheerfulness and good humour with which they accepted their sixteen weeks' solitary confinement. At times the resources of our commissariat were taxed to their utmost. Beef, which is stored in our safe on the balcony, and retains its freshness for a fortnight in cold weather, demands a liberal salting at present, otherwise it does become a trifle "gamey," but, on the whole, it is preferable to its relative in tins—a relationship, by the way, extremely difficult to prove, and hopelessly so should the label be missing. What though at times a transverse section of our loaves disclosed a landscape in cerulean tints undreamt of by the most vivid impressionist, the transference to "hard tack" was accepted with better grace than when a similar move had to be made from the salted meat to the "embalmed commodity."

## *AUGUST 1902.*

THE coating of acorn barnacles with which the higher surfaces of the Rock and also the base of the tower are whitened in summer is fast disappearing before the ravages of that ruthless destroyer the white whelk. Seen from the balcony, this encrustation resembles a lime-haurlled wall, and presents a suitable background for the observation of moving objects under water. These barnacles are frequently mistaken by the casual observer for young limpets, whereas, unlike the limpet, which moves freely from place to place in quest of vegetable diet, the moment the young barnacle settles to erect his limey habitation, he possesses a fixity of tenure which terminates only with his existence. An outer wall, with razor edges, surrounds a hollow cone, his private apartment, and probably guards his four-leaved door from injury. This opening, through which all business with the outer world is transacted, is scarcely discernible when above water; but immediately the tide covers it, the hollow cone is seen to fall apart in four vertical sections, a bunch of fingers is thrust forth and rhythmic clutches made at invisible food. How little they resemble their relatives who swing by their pendulous stalks from ships' bottoms or submerged wreckage, and see the world without any exertion of their own. The ancients firmly believed that from these animals certain birds were produced, probably from the resemblance of their shelly casement to the beak of a bird, and the bird known as the barnacle-geese owes his name to this belief. Even to-day there are persons who solemnly declare that the Northern Diver is so evolved.

Another fallacy common amongst fishing communities on the West Coast is the attributing the destructive effects of

the *teredo navalis*, or ship-worm, to the innocent barnacle, whose only fault is the resistance their multitudes offer to a ship's progress through the water. A log of wood which has been adrift at sea for a lengthened period will generally be found to have its surface clustered with pendulous barnacles. The removal of these disclose minute pin-holes on the surface, which, in the interior, assume the diameter of a man's little finger, and permeate the log from end to end like a honeycomb. Each little tunnel is smoothly enamelled with a deposit of lime by this indefatigable borer, the *teredo*. Though boring parallel with his neighbour, the thickness of paper only separating them, they never, by any chance, encroach on each other's bore. Their tracks are seen to abruptly diverge when all but into that of their neighbour, so that they are evidently cognisant of each other's proximity, an interesting fact also apparent in rats on board wooden vessels, who, though they will gnaw their way through any woodwork, instinctively refrain from suicidal attempts on the outer skin of the ship.

On the memorable 9th we had a bird's-eye view of the Coronation celebrations in Arbroath. With the aid of our telescope the crowds on the Common were clearly visible, the ladies in white dresses being most conspicuous. The flash of the guns firing the royal salute was seen fifty-five seconds before the report reached us. In the afternoon the sports in the Victoria Park occupied our attention, and the white-clad competitors in the high jump could be seen taking their preliminary run and rising over the obstacle. Parties straying on the beach had only their heads visible, and as they neared the margin appeared to vanish under water. The progress of the bonfire on the Common at night was also watched, and the moving figures could be plainly seen silhouetted in the glare. Probably but few noticed our attempt to celebrate the occasion. Two strings of flags from the balcony to the rocks fluttered gaily in the breeze, while the balcony railing was similarly decked. Amongst those suspended from the rail was a flag of peculiar interest, namely, one which had been sewn by Miss Stevenson, a sister

of the builder, Robert Stevenson, almost a hundred years ago. The central subject depicted on the white ground is the Bell Rock Lighthouse ; on the right, the patron saint of Scotland with his cross ; while a ship under full sail occupies the left, the whole bordered with a deep edging of red. The figures are extremely well executed, and the colouring to the flesh tints remarkable. The flag was presented to the Rock by Miss Stevenson to be used as a table draping during divine service.

Several white butterflies and moths innumerable were seen passing here this month. It seems these insects have their migratory periods as well as birds, and at stations favourable for their observation they appeared, to quote from a writer in a recent number of "Chambers's," "as a dense snowstorm driven by a light breeze, and this not for one day only, but for many in succession. Whereas birds come and go with clockwork regularity, the immigration of butterflies is uncertain, and of all those which survive the perils of the deep no single one returns."

## SEPTEMBER 1902.

A GOOD deal of heavy weather has been experienced on the Rock this month, and the stability of our new lantern subjected to a fair strain, though probably nothing to what it will have to encounter during the course of the winter. The lantern—composed of gun metal astragals, narrowed to the utmost limit compatible with strength, in order to intercept as little light as possible—may be looked upon as a huge hollow cylinder of glass, which in itself seems but a feeble barrier to the onslaughts of the storm. But the three tiers of triangular panes are of heavy plate glass, and the apparently slim like astragals are braced together in the most effective manner to ensure the greatest degree of strength, and need cause no uneasiness to the stranger viewing the outlook during the progress of a gale. It is awful to think that out in that dark void, amid the warring elements, fellow beings may be battling for their lives in close proximity to where we sit in comfort and security, totally ignorant of their condition, and utterly helpless to render them the slightest assistance. Probably a case in point occurred during the gale of the 3rd. On the 9th, about noon, we were somewhat surprised to see the gunboat *Seamew* approaching the Rock with a hoist of flags, indicating that they wished to communicate with us. Bringing up close to the Rock, they signalled, "Have you seen a vessel in distress?" to which we answered "No"; and then remembering we had seen a torpedo boat pass the day previous, and fearing another case of "buckling" had occurred, we asked "Was it a torpedo boat?" in reply to which they communicated the intelligence, "No; it is a sailing craft from Anstruther last Wednesday, and seven hands." On our replying "We have not seen her," the signal "Thank you" was hoisted, and the gunboat steamed out to the eastward on

her sorrowful quest. Passing a torpedo boat at gun practice, she was seen to signal her also, with the difference that the flags then used had no existence in our code. Later in the evening she was again seen making for Dundee.

We have had several takes of fish of late, though there seems to be a scarcity of "fry" compared with last year, the absence of which probably accounts for the terns failing to call upon us with their young for a few weeks' feasting prior to commencing their migratory journey southwards. Gannets may be seen at present striking at fish within a few feet of our doorway, while a flock of young gulls hover expectantly, with feeble peeping cries anticipating the feast in store for them when the dinner scraps make their appearance. Further off a few eider ducks—who only arrived on the 25th, somewhat later than last year—evidently eye the proceedings of these juvenile degenerates with disdain, preferring to refrain from such pampered luxuries and dine on the products of the chase alone. The eiders present are as yet all adult males, the females presumably still occupied with family cares teaching the young idea how to shoot, or rather fish, if plucking mussels, catching crabs, etc., can be called so, for such is their diet, and does not include fish. Strange that the foremost arrivals among migratory birds are all males. Why this is so is not agreed upon by observers, some supposing that the females are detained by maternal duties; others, again, affirm that they migrate *en masse*, and that the more vigorous males soon outstrip and ungallantly leave the gentler sex to bring up the rear. On the 6th we had our first intimation of the autumnal migratory flight in the arrival of a flock of wheatears, accompanied by a solitary wren. On the 27th several greenfinches, larks, and starlings were making insane efforts to follow the line of *most* resistance, resulting in our new lantern receiving its first baptism of blood, as the glass next morning testified. Several porpoises are to be seen puffing and blowing a mile off, and on the 28th a school of "finner" whales were seen heading north.

I see by the *Arbroath Guide* that one of our old fog bells

has been presented by our Commissioners to the Arbroath Museum, a fit resting place after its long sojourn on the Rock. Should the date upon it happen by any chance to become erased, what possible controversies it may yet become the subject of amongst posterity as to its connection with that mythical personage "Ralph the Rover." I myself can testify to its having conformed in one respect at least with that of the poem, for on lowering it from its position on the balcony for shipment the tide had overflowed the Rock about a couple of feet, causing the bell to settle with an audible gurgle, or as one of the seamen (Fraser) appropriately quoted, "The bell sank down with a gurgling sound."

## OCTOBER 1902.

WE have had occasional visits of feathered migrants during the month, but it is a matter of remark that each year sees a decrease in the number of arrivals here. Probably the increased number of lights on our coast accounts for this diminution, some proving more attractive than ours. A few years ago it was quite on the cards at this season of the year—thanks to the migratory instinct—to have an additional course at dinner, to which fieldfares, blackbirds, and redwings were the voluntary contributors, and even at times the gamey woodcock “graced the groaning board”—for our “board,” being double-leaved and somewhat senile, does occasionally groan, and this without reference to any superincumbent strain. Amongst the more noteworthy of our captures here, at various times, the following may be mentioned:—A peregrine falcon, large horned owl, small brown owl, kestrels, sparrow hawks, crows, cormorants, corn-crakes, and a turtle dove. Birds generally arrive here in a fagged condition, and are easily captured. As an instance, a kestrel landed on our balcony railing during fog, and, despite the explosions of our fog-signal twenty feet overhead, tucked his head under his wing and fell sound asleep. Another arrival of note was a common blue pigeon, which, after a few hours’ stay, surprised us by depositing an egg in our doorway. Disturbed on our appearance, it reluctantly deserted its treasure, but not without many backward glances before spreading its wings shorewards.

Podley-fishing has been fairly successful during the month, and several codlings have been taken from the pools at low water. Whilst photographing lately, another of our number was busy endeavouring to extract a breakfast from

Port Hamilton. Hooking a fair sized codling, the camera was turned on the scene, and fish *à la photo* figured in our bill of fare next morning. A few years ago a photo was taken of a paidle cock and hen, both of which were taken from their nests for this purpose, and proved amenable sitters; the cock appearing in the photo quite conscious of his importance, though the hen appeared somewhat bored, having been snapped in the middle of a huge "gape," which some of my previous sitters might interpret as a yawn. Both were returned to their nests none the worse of their unique experience, and possibly yet relate their feelings before the camera to the admiring wonder of fishy audiences, till puffed with the idea of their own importance they now probably suffer from a disease (peculiar to some higher vertebrates with as slender a reputation) resulting in what is colloquially known as "swelled head."

Wouldn't the fishermen of Arbroath fancy their lines had fallen in pleasant places should the fish they pursue at such hazard come sailing voluntarily into the harbour, and even without the usual ceremony of dropping them a line, appear on the surface, mutely asking to be lifted out? Such, however, was our experience lately. Shortly before daybreak one quiet morning our attention was attracted by the movements of a few gulls, evidently interested in some object in the water at the edge of the reef. As daylight advanced it was seen to be a large fish wobbling erratically upon the surface. On extinguishing the light and descending to the rocks, which the advancing tide had not yet covered, the fish was seen to have entered the Johnny Gray boat track, and was propelling itself, keel upwards, in our direction. A fish in this unusual position indicates an abnormal distension of the swimming bladder, which, by over-increasing its buoyancy, entirely upsets its centre of gravity, and forces it topsy-turvy to the surface. A steam trawler, which had been working close to the Rock for several days previous, was probably responsible for our friend's "blown" condition. Stepping gingerly over beds of white whelks as we wade bare foot to

welcome our visitor, we mentally contrast our inferiority with more juvenile days—a time when even road metal could be safely negotiated. The screaming gulls resent our interference with their expected feast, no doubt slanging us unmercifully as we land our capture, an arm-long lythe, safely on the grating. Their clamouring, however, is soon stilled, as each retires with as big a share of the offal as his strength and agility can command.

The long-tailed ducks are now only wanting to complete the list of our winter boarders, and their advent may be looked for early next month. The eiders have now attained their numerical strength for the winter, and are busily engaged picking up a living, not only for themselves, but also for the parasitical gulls which hover in close attendance, shepherding them with unwearied diligence. The peculiar cackling of the eiders—not unlike that of wild geese—becomes somewhat disturbing as their operations are occasionally carried on underneath our bedroom window. Gannets are now rarely seen here, but at their breeding haunts on the Bass Rock—which we had the opportunity of visiting while on our way here last relief—they are still in evidence, though by the end of the month they will have commenced their journey southwards. A new light is being completed on the Bass Rock, and on the first of December, yet another factor in our dwindling list of visitors will be in operation—ostensibly a lighthouse—but to our feathered friends, alas! a veritable slaughter-house.

## NOVEMBER 1902.

EXCEEDINGLY stormy weather, with a prevalence of sou'-easterly winds and heavy seas, has been our portion here this month, restricting our movements out of doors, till with circling round our promenade on the balcony one almost doubts the possibility of ever again being able to hold a straight course when opportunity offers. Workmen have been engaged this month fitting up a service of copper piping from the grating at the base of the tower to the cisterns in the oil store on the third flat, whereby the operation of storing oil will in future be rendered much easier. The oil will now be landed in forty-gallon casks, instead of the small six-gallon ankers as formerly, emptied into a sifting tank on the grating, and by means of a rotary pump forced upwards to the oil cisterns—a vast improvement on the old system, when each anker had to be hoisted indoors, and then shouldered upstairs to the cisterns.

A pleasing incident of the month was the arrival of a handsome present for each of the keepers, consisting of a silver mounted briar pipe, a pound of golden bar tobacco, and a liberal supply of first class reading matter. All keepers throughout the service—over 200—were similarly supplied, so that the gift will be seen to be a pretty extensive one, and the donor, James Coats, junr., Paisley, has without doubt earned the gratitude of the service by this generous act of kindness.

About the beginning of the month we had a few feathered visitors, chiefly blackbirds, fieldfares, and starlings. On the morning of the 5th several struck heavily on the lantern, but were swept away by the strong sou'-east wind then blowing. The gannets have now all disappeared, none having been seen

since the 27th. The eiders continue in close attendance and have had their numbers augmented by the arrival of the longtails on the 9th, a week earlier than last year, thus completing our list of regular boarders for the winter. At 6 p.m. on the 13th we were privileged with the unusual spectacle of a lunar rainbow. The bow—a faint white arc against the dark background—was distinctly visible in the nor'-west, though, of course, void of the vivid colouring inseparable from its solar namesake.

While taking a turn round the balcony on the evening of the 15th, our attention was attracted to what appeared to be a peculiar shaped mass of foam resting on the rocks immediately beneath us. On careful observation, however, the object was seen to move slightly in the faint moonlight, and by the aid of our telescope the outline of a seal could be dimly seen. On the change of the watch at 6 p.m. an attacking party, including the workmen then on the Rock, was organised, and a plan of campaign drawn up. Descending the outside ladder, which was fortunately in deep shadow, we were able to gain a footing on the Rock unperceived. His suspicions had, however, evidently been aroused, as he was seen to lift his head sniffing uneasily in our direction. Bracing ourselves within the margin of the shadow cast by the tower, we charged down upon him at the double, expecting to see him beat a hasty retreat to the water; but, to our surprise, he made no effort whatever in that direction, but seemed to consider himself quite a match for us, and that there was no present necessity for retreating. Snarling and snapping viciously as we surrounded him, he appeared at a great disadvantage compared with his agile movements when in his element, his hind flippers being now of practically little use to him, his lumbering movements being effected by the aid of the fore flippers alone. His furious efforts to sample portions of our anatomy were easily avoided, and by laying hold of his hind flippers, as one would trundle a barrow, he was immediately placed *hors-de-combat*. An unfortunate squid or cuttlefish, which had been left stranded by the receding tide, when pushed

within his reach was seized and energetically shaken with all the vim of an accomplished ratter. The wooden shaft of a boat-hook was similarly treated, and still bears evidence of his utter ignorance of the dental profession. A rope being procured, a clove hitch was slipped over one of his hind-flippers, the other end made fast to an eye-bolt on the Rock. Thus secured, he was left to his novel reflections for the night.

As the tide covered the Rock he could be seen in the clear moonlight ploughing along the creamy surface, stretching his



tether in every direction in futile efforts to escape. At daylight next morning he was found sheltering under a projecting ledge of rock. What a clean, well-groomed fellow he looked, with his sleek, glossy coat glistening in the sunshine, his squat, plump body adapting itself to the inequalities of the surface on which it rested. His coat, by the way, as much fur as that of a horse—grey above, mottled with dark spots, while the under surface is of a creamy yellow. His beautiful teeth gleaming white against the scarlet interior of his mouth,

as he snapped fruitlessly on either side, suggested the maximum of robust animal health. As a memento of his visit the camera was brought on the scene, and another addition made to our list of illustrious visitors.

Liberating him proved to be more difficult than his capture, for when cut adrift he persisted in facing us instead of making for the water, towards which we endeavoured to drive him. After some manœuvring, however, he was driven to the edge of the gulley, but even with his body half submerged he maintained a defensive attitude, not seeming to realise that he was at liberty to depart. An incoming wave, however, moved him to a sense of his position, and with a defiant snort he slipped under water. Omitting, in his hurry, to take proper bearings, he took the wrong direction, and, finding himself in a *cul-de-sac*, made his appearance again on the surface, and with a hurried glance at his position again sank, this time making a bee-line for the outlet, being clearly seen, as he passed under water close to where we stood, and was last seen buffeting his way through the foaming breakers, evidently none the worse for his compulsory detention on the Rock.

## DECEMBER 1902.

THE broken stones and other debris, consequent upon the late alterations here, which had collected in various holes in the Rock and maintained their position up till now, have nearly all been cleared out by the severe gales of this month, and a couple of heavy iron poles, erected lately to mark the boat tracks or entrances to the landings, and which were sunk two feet in the solid rock and heavily cemented, have been shaken loose in their sockets by the pounding seas which have been besieging us of late. The rocks appear bleak and bare, and utterly void of vegetation. The white whelks have collected their scattered forces, and gone into winter quarters. Secure in sheltering nooks, they lie huddled together in close packed squadrons. Numerous small white banded whelks adhere to the base of the tower with a tenacity that seems surprising considering the swirling seas they are subjected to. This species, however, never seem to dream of hibernating. The eiders and longtails, with an unswerving attention to business, pursue their calling amid the hurly-burly of broken, tumbling seas—evidently little concerned whether the weather be fair or foul—and in the glassy hollows alternating between the breakers they can be distinctly seen scurrying over the rock surface like so many fish. Gannets this month are conspicuous by their absence, and only a few parasitic gulls divide their attention between the kitchen refuse and the hard won earnings of the eiders.

On several occasions during the month our fog signal was brought into action through the occurrence of heavy snow-falls. A silent, feathery fall on shore no doubt has charms peculiarly its own, but at sea constitutes a very serious danger to the anxious mariner as he steams at reduced speed through

the fleecy curtain, shrieking his every two minute warning, his vessel's head scarcely visible from the bridge. In snow-storms such as we have had of late our lantern soon becomes plastered up with snow on the weather side, necessitating constant removal to prevent it from completely blinding our light in that direction. This is an operation often accomplished with difficulty, especially when carried out in the teeth of a gale—an experience somewhat akin to lying out on a yardarm under similar conditions, only one doesn't have the lift and 'scend of the vessel to contend with ; yet his grip must be equally as sure, or, as the old salts phrase it, "Every finger a fish-hook," on such occasions. Mounting by an outside ladder to the grated gallery which encircles the base of the lantern, one is exposed to the full force of the blast, and a firm grip must be taken to avoid being blown away. Below, the seas in wild tumult break against the building with a deafening roar, sending a perceptible tremor through the entire structure with each impact. Only by energetically hauling on the hand-rail can the slightest progress be made in the desired direction, the wind's eye being the objective point, where possibly on arrival one may find himself pinned flat to the lantern, like an entomological specimen, by the force of the wind. The snow removed, the return journey is effected by simply allowing oneself to be blown gradually back.

While relieving the Bass Rock on our way ashore last relief, a good opportunity was afforded of witnessing the mode of effecting a landing under adverse circumstances. On arrival there, it was considered dangerous to attempt a landing at either of the two landing places, owing to the heavy sea then running. The landings—a flight of concrete steps from the water edge to the rocks above—are situated on either side of a slight promontory immediately beneath the lighthouse ; and as deep water obtains to the rock face, it will be obvious that similar conditions must frequently prevail at either landing. The boat being loaded with the necessary stores, and the relieving keeper on board, an

approach was made to within suitable distance of the Rock. A kedge anchor was then thrown overboard, and the boat slacked down till within working distance. The keepers meanwhile had been busy erecting an iron pole or derrick on the rocks above the position now occupied by the boat, and which, being slightly inclined seawards, a tackle from its extremity was drawn by means of a guy-line to the boat, and the stores hoisted ashore by the keepers in charge of the tackle-fall above. Seated in a loop of the rope, the relieving keeper was then hoisted, and his shore-going neighbour similarly lowered. As an extra precaution, a second boat was sent from the ship to stand by the working boat in case of accident. Fortunately, however, their services were not required.

Our final relief here for the year was effected with some difficulty on the 29th. Owing to the doubtful aspect of the landing, only one boat was sent ashore instead of two as usual. The fortnightly supply of coal and water being omitted on this occasion does not, however, inconvenience us, as a three months' reserve stock of necessaries is always maintained during the winter months.

## *JANUARY—FEBRUARY 1903.*

BRIGHT, sunny weather characterised the opening day of the year, the sea assuming a suspicious placidity quite summer-like in appearance but for the keen nip in the air perceptible out of doors. This state of affairs, however, proved but ephemeral, and for the remainder of the month we have experienced most boisterous weather. Strong westerly winds occasionally attained the force of a gale, accompanied with driving seas, which roared and sang a lullaby scarcely compatible with the shore-dwellers' sense of security, but which, strange to say, has a more somnolent effect upon us than a breathless stillness, though an occasional thumper of a sea, more forceful than its fellows, demonstrates the stability of our domicile by imparting a gentle tremor to the entire structure, awakening in the sleeper a glimmer of consciousness and a hazy impression of a traction-engine lumbering somewhere in the vicinity.

Our entrance doorway—thirty feet from the Rock—faces south-west, and is guarded by a heavy double leaved door, which opens outwards, and held open against the building by means of heavy brass thumb-snecks. An inner or vestibule door of solid brass is placed six feet further inwards—the walls here, by the way, being seven feet thick, tapering to one foot immediately beneath the balcony, sixty feet higher up. This door is also double-leaved, with the upper panels of heavy plate glass, frequently obscured by the strong westerly wind whipping the tops of the seas as they rise in front, and carrying them souse into the doorway. Standing here during the prevalence of a gale, the outlook is being constantly darkened by a curtain of hissing foam drawn across the doorway, as each sea breaks against the base of the tower, flinging the spray high overhead. Fifteen miles in front of us lies the Isle of May, with its castle-like lighthouse crowning its summit, while on a lower level stands a white-washed relic—remnant of a time, not so long ago, when the Island boasted a double light, and electricity had not as yet usurped sole sway. Emerging from the right of the May

appears the bluff outline of the Bass Rock, while away in the far distance North Berwick Law cleaves the sky-line. Away to St Abb's Head, on the left, the Haddington coast stretches hazy and indistinct, while the green, grassy slopes of Fife, with the spires of St Andrews faintly visible, fill in the right of the picture. Laying hold of the man-ropes suspended in the doorway, and turning to the right, the Forfarshire coast is seen extending from the Tay in a long unbroken line, with the snow-clad Grampians towering majestically in the background. Right in front of us are the smoking stalks of Arbroath. Two conspicuous white dots in the foreground mark the pierheads, in front of which an impatient "flaxer" cruises in glorious uncertainty of ever being permitted to fulfil her charter and deposit her Riga-run freight on the right side of the bar. This is the panorama from the viewpoint of our doorway on a clear day, but, as seen of late through sheets of flying foam, it reminds one of a cinematograph display, in which the films are far from perfect.

On the first Sunday of the year hundreds of gulls were seen resting on the surface of the sea, half a mile nor'-west from here, evidently by their movements enjoying a feast of "fry," and in all probability proclaiming the presence of herring shoals. During the gale of 10th January over a dozen gannets were seen swooping and diving, presumably at herring. Only with difficulty could we maintain our position on the balcony, owing to the force of the wind, yet these birds circled and dived amid the turmoil of wind and water with a graceful ease and precision that seemed truly wonderful considering the force of wind they occasionally beat up against, or, as they turned broadside on, were wafted without the least exertion in the opposite direction. The first week of February saw hundreds of these birds back to their breeding haunts on the Bass Rock. From the deck of the "Relief" steamer lying within a few hundred yards their movements are clearly seen. Each projecting ledge of the precipitous cliffs is tenanted by some members of the cackling crowd, their heads see-sawing from side to side. The birds are evidently engaged in brisk conversation, a monopoly of which is certainly

not tolerated amongst them, judging by the vigorous efforts of each to be heard above his neighbour. Probably the new lighthouse is being discussed in the light of an innovation on their ancestral rights of possession, and later, as its beams fall athwart their nursery, tradition may recall man's former intrusion on their solitary keep many hundred years ago. No doubt their ups and downs since last meeting on *terra firma* are fully discussed, for it is a curious fact that these birds are rarely, if ever, known to rest on shore except when engaged in domestic duties. Occasionally a depraved specimen may be seen floating helplessly on the water, a victim of his own gluttony, having dined not wisely but too well.

February has been a repetition of its predecessor, cold and blowy, with excessive rainfalls. In a shallow depression on the higher rock surface our attention has been attracted to a solitary plant, a specimen, I understand, of "*Himanthalia lorea*." A cylindrical stem (an inch in length) supports a thick, fleshy disc, about an inch in diameter. From the centre of this disc three separate branches rise with their terminals, blunted at first, but which were gradually seen to bifurcate. This is *our* "flower in the crannied wall," and is in its own way equally as suggestive.

The eiders are occasionally seen varying their diet with a vegetable course. Seizing the tip of a tangle blade two or three inches from the surface, they spin round it like a top, till the portion held in their bill is twisted off and greedily swallowed. No need for them to evade the gulls while engaged in this repast. It is most amusing to witness the discomfiture of the gulls as they hurry from a distance expecting to share in something edible, only to find the duck negotiating six inches of seaweed. That the white whelk itself is not immune from enemies was recently brought before our notice, one being picked up with a long black worm dangling from its mouth. On withdrawing the worm—somewhat resembling a boot lace—portions of the deceased tenant followed. Doubtless every organism has its own particular parasite.

"Big fleas have little fleas upon their backs to bite 'em,  
And these again have lesser fleas and so *ad infinitum*."

### MARCH 1903.

TRADITIONALLY correct, the advent of this month was decidedly leonine, and its exit as certainly lamb-like ; but between these periods, though a few really beautiful days could be credited to the latter symbol of peacefulness, the lion was largely in the ascendant. Borne on the off-shore wind comes the odour of heather—not the fragrant perfume one usually associates with this sweet-smelling plant, but the smoky incense consequent on moor-burning—and at night the higher levels of the coast line exhibit lights which are certainly not recognised in the Mariners' Sailing Directions.

Over a score of steam trawlers have been busy in our neighbourhood all the month. Sunday or Saturday is all the same to them ; they are at it night and day, and the weather must be bad indeed to detain them in port. Often they are seen passing here burying themselves to the foremast in the seas on their way to the fishing grounds, perhaps twenty miles outside of us. The Rock seems to be a recognised stage in their journey ; for, whenever abreast of it, over goes their log, and a compass course is laid for the distant banks. Here, far outside the three-mile limit, the presence of the *Brenda* or the *Minna*\* causes no alarm ; and, providing their numbers are correctly exposed, receive no interference from these coasting policemen. A few summers ago, one of these same trawlers, while on her way out from Dundee one Sunday, surprised us by driving right up on the reef in broad daylight, a hundred yards from the tower. Fortunately, the sea was like glass at the time, otherwise the consequences must have been disastrous. The tide being on the ebb, their attempts to back off were unsuccessful ; and there they remained hard and fast from one o'clock till six in the evening, when a passing trawler succeeded in towing them off, evidently none the worse of their brief acquaintance with the Bell Rock. During their detention, the crew paid us a

\* Fishery Board cruisers.

visit in their boat, recalling to our mind a story in which a clumsily handled brig, in coming to an anchorage in a crowded harbour, ran aboard of a vessel already anchored. Visiting this vessel a few days later, to apologise for the occurrence, the offender was thus announced by the steward: "Captain S—— has come on board, Sir." "Oh, indeed," sarcastically remarked the aggrieved mariner. "Has he brought his brig with him?"

The rocks are this year more plentifully strewn with mussel-spawn and acorn barnacles than usual; and already the whelks have sallied from their winter's sleep, bent on their destruction. Hundreds of hermit crabs have also made their appearance, notably first in the deeper pools, but gradually taking up their quarters in the shallows. Towards the end of the month, a few small spats of paidlefish spawn were seen deposited in convenient crevices of the rocks. This is unusually early for "nesting" operations, and engenders hopes of an early fishing, as the ova is generally the first inducement for the wandering cod to come within reach of our rods. Numerous clusters of the wheat-like ova of the white whelk are also seen; but, unlike that of the paidlefish (lumpsucker)—which may be detached from its gelatinous fastenings in a solid mass—each egg adheres separately by its own footstalk. Though the adult "paidles" are only to be seen here during the period of incubation—the term seems quite applicable, seeing that the guardian "cock" is always in close attendance, with his nose thrust into the centre of the mass of ova, at which point there is always a depression, and frequently a hole right through it—juveniles are occasionally met with at all seasons; and, on the first anniversary of their birthday, are seen to have attained the length of two inches.

Numbers of peculiar looking slugs are met with at present, somewhat resembling a section of a small orange with the skin attached. On their upper surface, near to one end, a minute orifice is seen, through which a small rosette like arrangement is protruded when at rest, but which is instantly withdrawn when the animal is disturbed. This is the only visible sign of life in this otherwise inert object, and is probably its means of obtaining a living. Its under or ambulatory surface is similar

to that of a limpet, without its tenacity, but with a somewhat similar rate of progression. Another small slug noticed this month—no larger than one's finger nail and recalling the general appearance of the "fretful porcupine," with "quills" arranged along its back, and displaying beautiful shades of brilliant blue and crimson.

*Saturday, 14th.*—A beautiful warm sunny day, the sea like glass, dappled here and there with great greasy-like patches peculiar to still weather. Flocks of eiders, longtails, and gulls appear to be having a day off, and float listlessly hither and thither, seeming only intent on making themselves aggressively audible in the stillness, the longtails piping a shrill treble to the sonorous bass of the eiders, while the gulls contribute a fairly good imitation of a laughing chorus. Later, the gulls are seen to bestir themselves, as myriads of small circles break the glassy surface in their vicinity, betraying the presence of "fry," their legitimate food. Pecking from side to side as they float silently through the shoal, they evidently enjoy the feast thus provided for them. The sight of the gulls thus engaged apparently reminds the ducks of their negligence in this respect, and paddling full speed ahead, they are soon busy diving in the shallower water of the reef. The longtails push their way right up to the base of the tower, round which they are seen circling, plucking at the green vegetation adhering to the stonework, and cackling loudly as they breathe for a few seconds on the surface, all unconscious of our presence on the balcony above them. A small piece of coal dropped while they are still under water causes them to shoot away like startled minnows, and only when they have put some distance between them and the source of alarm do they make their appearance on the surface, evidently much flustered by the mysterious noise. Though a couple of fathoms deep, their alarm was apparent at the same moment the coal struck the surface, proving that the sound and not the appearance of the falling body was the disturbing cause. The end of the month still sees them in close attendance, but any day now may witness their exodus. But few spring migrants have come our way this month, principally a few blackbirds, thrushes, and starlings.

### APRIL 1903.

WARM, sunny weather in the earlier part of the month raised our hopes of a change of diet, and, coupled with the early appearance of the paidlefish spawn, our expectations of an early fishing ran high. On the 8th, the capture of three small cods in "Johnny Gray" track increased our hopes, and again on the 9th, eight were taken, but since then we've had no other. Cold, blowy weather, with heavy seas, has rendered all attempts in this direction futile; however, the attraction—as evidenced by the stomachs of those captured—still increases, and numbers of bloated paidle "hens," with their lower jaws protruding like a prize bull-dog, are seen cruising sluggishly among the tangles in quest of a suitable nesting place. The nests this season are unusually small; sometimes they contain as much ova as would fill a quart pot. Each ovum is a sixteenth of an inch in diameter, and were all permitted to come to maturity—instead of becoming food for other fishes as most do—would soon fill the sea of themselves. "All nature is at one with rapine and war," and necessarily so, otherwise we would soon be crowded out of existence.

Our winter residents, the eiders and longtails, have gradually disappeared. On the 4th, a representative pair of each alone remained, but these have now thought better of it and gone the way of their more sensible comrades. A few gulls, herring, and kittiwakes hover about, and guillemots and gannets are now common.

The gannets, I am informed by the keepers on the Bass Rock, commenced laying there on the 11th. The solitary egg these birds deposit is heavily coated with lime, which, when scrubbed off, exposes a pale blue surface. This coating is probably the origin of the fallacy that these birds ensure the

safety of their eggs by cementing them to the bare rock. On the contrary, each nest is composed of quite a barrow-load of material of the most miscellaneous description. One of these nests noted on the Bass this season was seen to have the end of a soft-soap barrel for a foundation, armfuls of withered grass, dried tangles, bits of rope, string, cotton waste, and other flotsam and jetsam picked up about the Rock. Amongst the lining of the nest, pheasant and partridge feathers were seen, which were certainly not garnered on the Bass. The harvesting of the withered grass was accomplished between dark and daylight, and, therefore, unnoticed by the keepers, but the area of their operations, as seen next day, suggested the presence of a lawn mower. Thousands of these birds are slaughtered annually by the St Kildians as an article of diet, and the wonder is, considering the solitary egg deposited and that three years elapse before the adult stage is reached, that they continue so numerous.

Dr Wallace, in his "Natural Selection," speaking of birds in general, tells us that, if permitted to live, in the ordinary course of production "in fifteen years each pair of birds would have increased to more than two thousand millions. Whereas we have no reason to believe that the number of the birds of any country increases at all in fifteen or in one hundred and fifty years. On the average, all above one become food for hawks and kites, wild cats or weasels, or perish of cold and hunger as winter comes on."

Myriads of white whelks are now scattered over the Rock surface, and already patches of mussels and acorn barnacles have been cleared by their voracity. Their ova, which is to be met with in almost every nook and cranny, is left to take care of itself. A patch of this ova is situated in a position which a paidle-hen subsequently fancied for a nursery, and, scorning all rights of possession, plastered her ova indiscriminately over that of the whelks, with the result that they are now under the special care of the guardian "cock."

A stranded cuttlefish was an object of much interest one evening this month. What a queer-looking object it appeared,

with its eight long tentacles squirming in all directions, its body a slobbery mass of animated mucilage. Although only a foot in diameter it required some force to detach it from the rock, as each of the tentacles is furnished with rows of suckers on its under side. By extending the tentacles in front, the animal was able to move along the Rock surface, not in a jerky fashion, as might be expected, but with a continuous gliding motion, clearly showing that each sucker acted independently of its neighbour. If taken hold of, one or other of the tentacles is immediately twisted round the hand with a tenacity that seems surprising considering the size of the animal, and one can then realise to some extent the stories occasionally heard of its giant relatives of the tropics. Irritated, it appears to have the properties of the chameleon, flushing through all the gradations of colour in quick succession, and latterly discharging a jet of fluid of inky blackness. This resource, however, was utterly useless in the present circumstances, but, on placing the animal in a shallow pool of water, its use was at once apparent, for on being touched it immediately rendered itself invisible by the inky fluid discharged. Frequent irritation, however, exhausted its stock of ink, and latterly only clear water was expelled. This expulsion, when effected on the Rock, was accompanied by an audible murmur. The narrow slits of eyes closely resemble those of a dog-fish, and the head, with the anterior tentacle elevated in the air, grotesquely reminds one of an elephant in the act of trumpeting.

### *MAY 1903.*

DURING the first few hours of this month our lantern was the centre of a twittering throng of feathered migrants. Wheatears, rockpipits, starlings, wrens, and robins fluttered erratically through the rays or clamoured in their innocence against the glass, apparently desiring a closer acquaintance with the source of light. Puffs of feathers floated away on the easterly breeze as some unfortunate, less discreet than his fellows, crashed against the invisible barrier. The coming dawn, however, reveals to the survivors the absurdity of their position, and ere the light is extinguished they have resumed their journey shorewards. Frequent fogs occurred in the earlier part of the month, and during the prevalence of a long spell a long-eared owl was captured on the balcony and held prisoner for a week, during which time various samples of our commissariat were offered for his acceptance without avail. A luckless sparrow, the only one by the way I have seen here, was then captured and placed at his disposal. This proved more in his line of business, for on the morning after the rump and tail feathers alone were left. Next day the indigestible portions, feathers, etc., were cast up in the form of a compact ball. Later a thrush was similarly offered, but after a couple of days in each other's company remained untouched. It was amusing to see the spirited attitude assumed by the thrush when in the presence of his natural foe. Screaming aggressively at the slightest movement of the owl, he would lunge furiously in his direction, his bill all the while snapping audibly. The fog having cleared somewhat, both were then set at liberty.

Another very rare visitor seen here this month was a sheldrake, which passed close overhead flying south. This is

the first I have seen here, but in Orkney these birds are very numerous and are there known as the burrow duck, or sly-goose. Sly they certainly are, as evidenced by a pair which nested regularly within a couple of hundred yards of the lighthouse at which I was then stationed. A covered drain was the site annually chosen, the nest being placed several yards from the mouth, which opened out on a spacious grassy hollow. The bright brown and white plumage, with vermilion bill and feet, render these birds most conspicuous objects in an ordinary landscape; but squatting on a shingly beach, where their colours harmonise better with their surroundings, their presence is less easily detected. Frequently I have watched their movements with a telescope from the lantern, and though no one was stirring within seeing distance of them, the greatest caution was always exercised in approaching the nest. Lighting a hundred yards from the nest, a pretence of feeding diligently was made, though their heads could be seen frequently lifting in the direction from which intrusion was to be expected. Gradually circling nearer the nest, passing and repassing it with apparent indifference, till within a few feet of it they would then suddenly vanish. The exact moment of their entrance I was never able to note, as they appeared to assume an invisibility during the remaining few feet of their journey that was really astonishing, but which is less a matter of surprise when one has witnessed the squatting in concealment of a hen pheasant on sparse grassy ground. Burrow duck is a name applied to these birds from their habit of nesting in disused rabbit burrows. I have counted as many as forty young ones following a single pair, while others may have only three or four juveniles in their train. It is said they do not scruple to steal the young ones from each other. If alarmed while feeding among the decaying seaweeds on the beach, some of the parents will fly to meet the intruder and endeavour to divert his attention in another direction, while the others fly seawards, followed by their callow broods flapping their little wings, while their feet tip-tip the surface—a veritable walking on the waters.

Just as the rocks were being overflowed the other day, we had a visit of another bird which is but rarely seen here, namely, the oyster-catcher. The plumage beautiful black and white, the feet and bill a brilliant red; the latter, which is flattened vertically, suggestive of a stick of sealing wax. Though fairly well acquainted with this species, I never had the good fortune till now to see them in the rôle of limpet pickers, by which name they are known in some localities. From the balcony, with the aid of the telescope, his movements were brought within a few feet of us. Wading an inch or so deep, where the limpets were probably opening to the influence of the incoming tide, he appeared to make a judicious selection; then, with a single sidelong blow of his chisel-like bill, he turned the no doubt astonished mollusc upside down. Seizing it in his bill, he carried it to a still dry portion of the Rock, and in a twinkling he had the limpet out of its shell, and journeying up his long bill to its doom. The tip of the upper mandible appeared to do the scooping out, while the lower merely acted as a resistance outside the shell, the operation being performed more quickly than even the adroit oyster-man turns out his wares on the half-shell. Though not web-footed nor in the habit of diving, I remember seeing one of these birds, which had been winged with a gun-shot, dive repeatedly in order to escape further injury.

On the afternoon of the 16th, two days earlier than last year, a loud chorus of discordant voices floating to our bedroom windows announced the presence of a large flock of terns—their first arrival here since wintering in the sunny south. Screaming and diving, they appear tireless in the pursuit of their prey, which, with the aid of the telescope, is seen to consist of inch-long “fry.” How trim and neat they appear as they cluster on the rocks as the tide recedes, pruning their feathers and chattering vociferously; the head enshrouded in a black, glossy skull-cap, the back and wings a bluish grey, the under parts of unsullied white; the long sharp-pointed scarlet bill tipped with black in harmony with

the legs, and small webbed feet. This active little bird is also called the Sea Swallow, an *alias* assumed from its long narrow wings and forked tail.

The sea has been literally alive with large poddies this month. Morning and evening they can be seen "breaking" on the surface in pursuit of "fry," splashing loudly in their efforts. Though somewhat averse to our lure, we generally manage to secure a breakfast. On quiet, still days, good sized cod are seen prowling over the rocks; and, though lines were set at low water, they were seen at high water to pass the temptation with indifference. Fishermen aver that all fish have times when the most tempting delicacy fails to attract their attention; and possibly this is the case with those which have been lately under our observation. Hermit crabs at present are seen to be carrying spawn; and one which was removed from its shell was seen to have the spawn so far advanced that, when placed in a shallow pool, they released their attachment with the parent, and began life as free swimmers. A small fish of the blenny species, when taken from the crevice in which the tide had left it, was quite dark coloured, but when placed in a pool was seen to adapt itself to the colouring of the bottom on which it rested, assuming a mottled grey scarcely distinguishable from the pool bottom.

Painters have been busy for the latter half of this month repainting the outside of the building. Favoured with suitable weather, a fortnight sufficed for the operation of donning the triennial coat, which will explain the apparent proximity with which it has been lately viewed from Arbroath.

### JUNE—JULY 1903.

A CLOSE inspection of the flowing tide as it swirls around our gratings reveals the presence of myriads of minute globular jellyfishes—the *cydippe pileus*—said to be the favourite food of the arctic whale, though one would scarcely expect these bulky cetaceans to thrive or even subsist on such watery diet. Ranging in size from a pin head to a walnut, what a gap each mouthful must make in their numbers. The poddlies themselves are not averse to this form of food, as they are occasionally seen to disgorge them when landed in our doorway. The common jellyfish progresses through the water with a pulsating movement of the entire disc, such movement being termed “pulmonigrade,” and somewhat resembles the action of an umbrella being partially opened and closed. The mode of progression in the case of the *cydippe* is, however, different, and is termed “ciliograde,” as the propulsion is effected by means of eight vertical bands of cilia or minute plates overlapping each other. Each plate having an independent action of its own, the animal can propel itself in any desired direction, or, by resting them against its spherical body, sink to the bottom. In sunshine these animals in their evolutions emit the most beautiful combinations of colour one could imagine, but “you seize the flower, its bloom is shed”—scooped up in the hollow of the hand their beauty vanishes, and only a small spat of inert transparent jelly remains. Here at present in the Rock pools one may witness a peculiar phase in the evolution of the jellyfish. Along with many beautiful varieties of marine vegetation, miniature forests of fir trees garnish the bottom of each shallow pool. These liliputian firs, with their branches no thicker than a hair, are but plants in semblance, for here is the opening chapter in the life history of the medusae. Under the lens each fragile shoot is seen to consist of multitudes of small discs piled upon each other like so many saucers, each of which will, in due course, detach itself from its neighbour and enter on its new existence as fully

equipped as the exaggerated specimens frequently seen stranded on our beaches. Lurking amongst the vegetation in the pools are numerous tiny spider-crabs, roaming about in search of food. Only by their movements can they be located, as each bears about with it quite a luxuriant growth of vegetation, with which I understand all crustaceans would become invested did they not—ludicrous as it may seem—regularly attend to their toilet. The “spider,” however, unable to procure a living by force of arms like his bigger brother, has recourse to the subterfuge of posing as an innocent patch of marine vegetation, and by such concealment is enabled to capture food which would be otherwise unattainable. The females at present are seen to be carrying spawn. When changing their position in the pool it is somewhat surprising to see a portion of the plants, which one has been admiring, suddenly become endowed with the powers of locomotion, detach itself from the mass, and, ambling leisurely round the pool, come to rest on the fringe of some other patch with which it completely harmonises.

During the whole of June, at daybreak and again in the evening, the sea around us appeared literally alive with large-sized poddlies. Their continual flip-flop on the surface in pursuit of “fry” could be distinctly heard from the balcony. Though frequently within reach of our attempts from the doorway, they failed to appreciate our invitation to any extent, and only with much perseverance did we occasionally manage to breakfast at their expense. A few cod have been taken from the pools at low water. The deepest of these pools is about a couple of fathoms at low water, and has the reputation of being a sort of convalescent home, as fish are occasionally taken there which are in anything but the pink of condition. Fishing there lately, I hooked a cod two feet long, and was somewhat surprised to see the feeble resistance it made. On landing it, however, it was seen to be a most phthisical-looking specimen and in the last stages of emaciation, the bones almost protruding through the skin. Needless to state, his life was spared, and the patient returned to his element. I have frequently seen emaciated specimens

of the cod family, but as they were full grown, fishermen attributed this to old age, but this was certainly not the case with our catch, it being but half grown.

I often wonder if any one has noticed the following peculiarity. When fish show an unusual tenacity of life, that is, after being gutted and cleaned, exhibit strong muscular action for some time after, that this phenomenon invariably precedes a change of some kind in the weather, usually more wind or heavier sea. This at least is my experience from several years' observations.

The remaining patches of white whelk ova now appear flaccid and empty. Brushing the hand over the apparently empty capsules, a granular deposit adheres to the skin, which on close examination is seen to be minute whelks. Even with the aid of the lens the sulci or furrow, through which boring operations are conducted, is not yet apparent, but which later is common to this species. The rocks at present are thickly sewn with these juveniles, and myriads of adults are busy clearing the rocks of barnacles and immature mussels. As late as 28th July a solitary paidle-cock was seen guarding its nest; this is unusually late, as they are generally finished nursing by the end of June.

The middle of July brought us our first young tern, and towards the close of the month several were in attendance. A large school of bottle-nose whales crossed the reef on the last Sunday of July, their puffing and blowing being quite audible as they headed north, probably after herring.

Pleasure steamers from Dundee have been frequently round the Rock during June and July, some of the trippers evidently enjoying the sail, others emphatically not. One of the passengers, as the steamer got to windward of us, favoured us with a cornet solo, which we gratefully acknowledged with a dip of our flag. On several evenings an hour's fishing was given the passengers, but their catches could scarcely be expected to have any appreciable influence on the market. Broken weather, excessive rain, with occasional thunderstorms, describes the weather we have been having, the seasonable days of sunshine and warmth being few and far between.

### *AUGUST 1903.*

A MONTH of variable weather, much rain and heavy seas occasionally compelling the boats engaged in the herring fishing to run for it. Dearly bought indeed is their silvery freight as they thresh their way homewards followed by a stiff sou'easter, their oilskins glistening with repeated drenchings, and twelve miles' ploughing and a doubtful bar yet to be negotiated ere safety is reached. How different ! no running for home with us ; here we remain secure and comfortable amid the hurly-burly, and trust to the stability of the grand old building for our safety. Right well does it merit our confidence. After a century's buffetings with the elements, not a single sign of weakening in the never ceasing conflict is evident. Surely a creditable testimony to the honesty of the labour employed in its erection.

That herring are occasionally in our vicinity is evidenced by the industrious diving of the gannets, accompanied by large flocks of gulls and terns, and also by the presence of whales snorting and puffing close to the Rock. At low water the reef is covered with gulls and terns resting from their labours of the tide. Scorning such relaxment, the gannets, wheeling and diving, maintain their ceaseless chase, establishing their kinship with that bird of the Ancient Mariner, the tireless albatross. A skua or robber-gull has billeted himself amongst the gulls and terns, and is frequently seen harrying them of their legitimate prey. It is surprising that the terns at least, with their needle-pointed bills and belligerent propensities, suffer themselves to be so despoiled, and make no attempt to combine and drive off this pirate on the fruits of their industry. On the contrary, after a fruitless twisting and doubling in mid-air, in which they are invariably worsted, they seem to accept these periodic attacks of the skua as a matter of course.

Amateur fishers have been but seldom in evidence here this summer ; even the lobsters have enjoyed a season of comparative rest. Possibly the uncertain state of the weather prevented their usual visits. Towards the close of the month a trio of amateurs cast anchor—or rather what does duty as such—within hail of our kitchen window, a favourite spot of theirs. Lines were no sooner down than a brisk business began in cod, varied by an occasional poddley which has little or no market value, but which to us here is always acceptable, and forms the principal part of our catches. Several good catches of these have been taken here during the month. What appears to be whittings two inches in length is seen to be their food at present. The terns also are seen to be on similar diet, and though engaged in conveying a mouthful to their young ones, it in no way impedes their full flow of language, nor muffles in the slightest degree their strident throat notes.

During the unusually low tides occurring this month an opportunity was afforded of examining a most peculiar form of animal life of which I have nowhere seen any account. Attached to the rocks amongst groups of corallines this curious object\* has all the semblance of a bird's claw. Imagine the leg of a bird amputated at the knee, firmly fastened to the rock by the cut end, and imbued with life, and you have a fair idea of this animal. About half an inch in length, the "leg" is seen to be composed of segments, and terminates in three toes, furnished with sharp, curved claws, which keep up a constant clutching—at what is not apparent ; but the action strongly reminds one of a similar effect produced by juveniles who have become the proud possessor of a hen's foot, and for a piece of slate pencil—the usual juvenile currency—demonstrate to admiring companions the utility of the extensor muscles.

Last month we had the unique experience of being serenaded by the Dundee trippers with a cornet solo, but the last Saturday of this month fairly eclipsed this per-

\* Whale-louse.

formance. As we were about to sit down to tea we were somewhat startled to hear the regular beat of a drum and the unmistakeable music of the bagpipes. A hasty survey from the kitchen window sent us flying to the balcony, there to witness the novel sight of a ship, manned by boys—a training brig evidently, bound for Dundee. Bearing down upon us from the eastward, she approached close to the Tower, the tide being about full. Flag courtesies being exchanged, crowds of juvenile faces were seen lining the rail, while midships pipers discoursed some lively music, including the “Cock o’ the North.” The wind being light, the vessel made but little way, and as she slowly crossed the reef the youngsters lustily cheered us, which we returned as best we could. Breaking into song, the whole ship’s company favoured us with “Poor Cock Robin,” the youthful voices having a most pleasing effect in the stillness of a really beautiful summer’s evening. Applauding our loudest, cheers were again exchanged as she slowly drifted beyond our hearing, the whole scene strongly reminiscent of “H.M.S. Pinafore.”

### SEPTEMBER—OCTOBER 1903.

THE man that pours the water out has certainly been paying attention to his business, and in conjunction with the puffy bellower of storms favoured us with weather anything but peaceful. Unlike the farmers, we have little cause of complaint. No sodden fields or ruined crops appal the eye, for even after a "regular snorter" things here remain pretty much as they were. True, the aspect changes as the season advances. The whitewashed appearance of the rock surface in summer, due to the presence of the acorn barnacle, has now vanished—thanks to the voracity of the white whelk—and the rocks appear in their natural colour, a reddish-brown. The "sere and yellow" is well represented in the once luxuriant crops of heavy tangles, but lately swaying on the surface with a freshness and beauty peculiarly their own, now storm-tossed, frayed and abraded, denuded of their palm-like fronds, they appear but a vestige of their former selves. The turbulent state of the weather interferes seriously with our fishing, keeping the poddlies at a respectful distance from our door; indeed, any approach in our direction at present would certainly denote suicidal mania on their part. At a safe distance outside the breakers, they are to be seen playing on the surface in the early morning and evening, so that our expectations are still high should the weather but abate.

The eider ducks, which on the 20th September were represented by a solitary individual—the first arrival—now number over a hundred. The longtails are still awaiting to complete our list, but their advent may be looked for early next month. On suitable nights for the past two months we have always had some feathered visitors "becking and booing" to us through the lantern. On 4th October an extremely rare visitor—here at least—made its appearance, namely, the ring-ousel, the first I have seen. In size, shape,

and general colouring, this migrant might easily be mistaken for a hen blackbird, but for the conspicuous white crescent across the throat, in this instance somewhat faint, but well defined, owing possibly to the bird being in immature plumage. On the morning of the 24th October over two dozen tiny gold-crest wrens were circling round our lantern, jostling and tumbling over each other in frantic efforts to keep in line with the white flash, the red flash evidently having no attraction for them. A skylark and robin were also of the company, as well as several redwings. The robin always seems to have a truer sense of his position than any other of our visitors. While the others clamour futilely against the glass he maintains an aloofness and self-possession truly remarkable. His eyes seem to be everywhere, and only with difficulty and the exercise of a little strategy is his capture effected. Of course, our captures are but temporary, and merely for the sake of a few minutes' examination.

We had rather a disappointing experience with the Channel Fleet while cruising in these waters last month (September). Passing north in the dark, we were quite unaware of their presence, the *Sutlej* alone being seen later steaming north at 6 p.m. on the 21st, nearer to Arbroath than to us. On returning south a string of brilliant lights passing three miles outside of us at two o'clock in the morning was all we saw of the procession.

On 29th October a flock of thirteen field-fares passed at 9 a.m., flying towards Arbroath. This is the first arrival here of these birds, and earlier than usual.

On examining a lark which had been killed on the lantern the other night, a small land shell was found adhering to the feathers on the under part of the body. Arguing from this instance, the assumption that they also are imbued with the migratory instinct and adopt this mode of travelling would probably be considered far-fetched. That there is much undreamt of in our philosophy is as pregnant as when uttered, and possibly the connection between mollusc and bird was due to circumstances other than purely accidental.

## NOVEMBER 1903.

SUNDAY, 1st.—A flat calm. A pleasant change, indeed, after our recent experience, and one which has fortunately continued for the greater part of the month. Fish, which had maintained a safe distance during the turmoil of last month, now ventured within catching distance, and several good takes were had. After the middle of the month heavy seas again drove them out of reach into deep water. Those that were caught were seen to be gorged with soil half an inch in length, resembling a piece of white thread with a black dot on either side at one end representing the eyes. Amongst the first that were taken the small jellyfish—*cydippe pileus*—seemed to have been their principal diet, but latterly the soil appeared to be preferred to the medusae. Outside the breakers they are still occasionally seen playing on the surface in the evenings. "Playing" is scarcely correct, as their play is, in reality, strict attention to business, and their appearance on the surface merely denotes their having overleaped themselves in pursuit of their legitimate prey. Our flock of eider ducks, much larger than it has been for several years back, now numbers 120. Amongst the smothering breakers they seem to be in their glory, and are busily engaged in clearing off the immature mussels that have escaped the voracity of the white whelks. On the 2nd, the first two longtails were seen, exactly a week earlier than last year, but their numbers are being but tardily reinforced, as they only totalled six at the end of the month. Though the main body of the solan geese or gannets left their breeding haunts on the Bass Rock on the 5th of the month for the fishing grounds—in the Mediterranean it is said—occasional stragglers are still seen in our vicinity.

On the night of the 8th we had a few migrants on the

lantern, ten blackbirds—three only of which were males—and three fieldfares. Several of them appeared much fatigued, and after a few preliminary hops round the lantern, settled down on the lee side to have a nap. A fresh breeze blowing at the time, those still on the move were frequently hustled by the wind against the sleepers, who, thus rudely awakened, vigorously resented what they no doubt considered a deliberate attempt to assault, with the result that all hands were at times engaged in a battle royal; the hen “blackies” only engaging with those of their own sex, while the cocks and fieldfares tackled all comers indiscriminately. It was rather amusing to witness the finish between a pair thus engaged. Edging round the narrow pathway in their struggle, they gradually came under the influence of the wind sweeping round the lantern, when suddenly one of them would be wheeled off its feet away into the darkness, its opponent peering after it in evident astonishment, and probably congratulating itself on its prowess. The haze, responsible for their appearance here, clearing after midnight, before 3 a.m. they had all resumed their journey shoreward. On the 20th, a pair of grey crows passed, going east, and on the 22nd a heron was seen travelling in the same direction. Again, on the night of the 27th, three hen blackbirds and a starling had the lantern all to themselves.

The white whelks have now gone into winter quarters, and only a few are to be seen lingering among patches of immature mussels. The black edible whelk, or periwinkle, whose vegetarian habits demand a more inshore life, is here conspicuous by its absence. Occasionally, during the summer months, a very close search reveals a few solitary specimens. Two different varieties of slugs have been much in evidence among the rocks here of late. One of them (*Doris coccinea*), resembling in shape and colour a section of an orange, I have already described; the other somewhat resembles the common snail. Furnished with anterior horns and fleshy spines, ranged along the back, it curls itself up when out of water like a hedgehog. Earlier in the season they were mostly of a

beautiful bluish colour, now they appear quite red. Without any visible means of defence, one can fancy these shell-less molluscs furnishing a delectable tit-bit for a hungry cod.

Turning over some loose stones in the shallow pools numbers of young paidle-fish are seen adhering to the under sides by means of their breast suckers, and when taken in the hand readily adhere to the fingers. I lately saw an illustration in which the paidle "hen" was depicted as leading a brood of about two dozen juveniles after the manner of the domestic fowl. This is stretching the simile with a vengeance, and not in accordance with facts. The "hen," on depositing the ova, takes no further interest in it, and the "cock" alone guards the nest till the young are hatched out, when he also disappears, neither of them being seen till the following season. Considering that each nest probably contains millions of embryos, one can imagine the maternal anxiety in "airing" such a brood.

Cooped indoors so long, one is glad to take advantage of the quiet weather and the absence of the tide to enjoy a spin along the gratings, even though at night and in darkness. At first the darkness seems to preclude all possibility of holding a straight course along the narrow path, but as the eyes get accustomed to it the twenty steps and a round turn can be accomplished with wonderful precision. Should the round turn be omitted, however, you will probably be reminded of it by coming a cropper on the Bell Rock, which, though historical, is not at all sympathetic. A similar omission at the other end meets with more sympathy, if such sentiment can be said to enter Neptune's embrace. The flash from the lantern overhead sheds no light below, though some fugitive rays escaping between the flashes illuminate the outlying perches or boat-guides. Any attention to these wandering rays occasions a halting tendency in one's steps and a disposition to lurch laterally, demanding our undivided attention. The night is clear and dark and the various lights along the coast, which on moonlight nights are partially eclipsed, now show to the best advantage. Fifteen miles to the sou'-west

the powerful electric light of the Isle of May flings its quadruple flash with startling brilliancy, a faint bar of light travelling athwart the base of our tower with each flash similar to what would be produced by a lighted carriage passing at a few yards distance. This light is said to be of three million candle-power and is of the arc type, using carbons one and a-half inch in diameter. To a stranger entering the light-room while the light is in action a somewhat disagreeable sound is heard. This is occasioned by the tremendous current bridging the arc between the carbons, and for all the world resembles the sound made by a circular saw passing through exceedingly knotty timber. The Bass Rock emerges from the right shoulder of the "May," and prevents us seeing the light lately erected on its south side. A little to the right of the "May," the eye encounters the fixed white light of the North Carr Lightship, three miles off Fife Ness, and distant from us nine miles. This light consists of six small argand lamps, set in silvered reflectors and enclosed in a lantern encircling the mast half-way up. Colza oil was the illuminant used until recently in the North Carr Lightship, as it was formerly in all the Northern lighthouses, where it had ousted the more expensive sperm, but which in turn has been superseded by paraffin. The lamps are hung on gimbals to obviate as much as possible the pitching and rolling of the vessel. With due allowance for the exaggeration that a penny piece placed on the deck shows "heads" or "tails" at the vessel's own sweet will, one can understand that the motion in bad weather must be considerable. Table guards, though retaining the dishes on the table, do not in the slightest restrain the liberty of their contents, which find lodgment as they list. On such occasions the men resort to the expedient of squatting on the deck of their quarters with their backs against the bulkhead and their outstretched feet firmly opposed to those of their opposite neighbour, and only thus, plate in hand, are they enabled to discuss their soup with any degree of certainty.

Further to the right, in line with the town of Crail—landlocked from us—a dull red glare in the sky marks the position

of Edinburgh, distant forty miles as the crow flies. Following the loom of the Fife coast, the twinkling lights of St Andrews next meet the eye, while further up the Firth the two fixed lights of Tayport greet their doubles of Buddonness on the opposite side. Midway between the lights of Tayport and Buddon a single flash every half minute marks the position of the Abertay Lightship. Unlike the other lights here mentioned, the three last named are under the control of the Dundee Corporation. Journeying northwards till almost at right angles to our starting point, the next visible are the lights of Arbroath, twelve miles distant. Viewed through the telescope how dreary and desolate they appear, without the usual accompanying signs of life, a feeble cluster in the vicinity of the harbour dwindling away to the Victoria Park in a solitary line. Further north the occulting light of Montrose Ness catches the eye with its thirty seconds of light followed by thirty seconds' darkness. Northwards still, twenty-five miles from us, the light of Tod Head, near Bervie, limits our view in that direction. Only in exceptionally clear weather is it visible from here, and then only from the elevation of our balcony. The characteristics of this light are six white flashes in quick succession during fifteen seconds, followed by fifteen seconds' darkness. Returning to our starting point, the Isle of May, and journeying till thirty miles due south from here, our view is again limited by St Abb's Head, showing a white flash every ten seconds. About midway between the latter light and the "May" the light of Barns Ness, near Dunbar, is, like St Abb's and Tod Head, only occasionally seen, its characteristic being a triple white flash every thirty seconds. The presence of these lights makes our coasts as safely navigable by night as by day, and the demand is still for more—a fact which drew from a facetious old "salt" the remark that "sailors nowadays want a hand-rail along the coast."

## DECEMBER 1903.

A MONTH of dull, dark, unsettled weather, with scarcely any sunshine to speak of, and admitting of but little heliographic communication with the "shore," a condition of things, by the way, preventing the "shore station" proclaiming to anxious eyes the interesting advent of another addition to the census. Quite a depressing effect is experienced at such prolonged absence of the land, and the reappearance of the Grampians, though swathed in winter vestments, would be a welcome sight. Our fish supply ceased early in the month, and its renewal need not be expected before the month of May. Gulls are numerous at present, and evidently on short rations considering their vigilant attention to the kitchen slops. Our only feathered visitor for the month was a belated bullfinch, who reached us only to die. The eiders and long-tails continue in evidence, and have now the company of four cormorants.

Star-fish are always plentiful here, though of course more numerous in summer. All are of the five-rayed variety, including the "brittle" star-fish, which, unlike its fellows, discards its rays on the slightest irritation, and possesses a body no larger than a shirt button, in ludicrous contrast with the squirming rays two inches in length. In startling contrast with the latter was a specimen found in a shallow pool early in the month, and which was quite new to us here. Six inches in diameter, the stranger appeared all body, with very short rays, of which there were twelve. Unlike the usual five-pointed star shape, it might be better described as a deeply serrated disc, the upper surface being richly coloured with concentric rings of crimson. Another object of note at present is seen scattered about the rocks, resembling small coils of ribbon, apparently the egg-cases of some fish. These

are white in colour, and somewhat resemble the outline of the human ear. The enveloping membrane, of rubber-like consistency, is quite transparent, and is seen to contain a frothy fluid. The inner edge of each coil is furnished with an adhesive margin, by means of which it is firmly fixed to the rock surface.

It is interesting to note the different modes adopted by fish to ensure the propagation of their species. Some, apparently careless of results, consign the spawn to the mercy of the waves, while others conceal it from predatory neighbours in the soft, sandy bottom. The skate family, adopting a different procedure with their egg cases—those purse-like receptacles often seen cast up on our beaches—moor them securely to the vegetation on the sea bottom by the long elastic tendrils—prolongations of the four corners of the case. Parental interest is, perhaps, better evinced in the case of the “paidle-fish” standing guard over his nest with unwearied vigilance, exhibiting all the care of a brooding hen for his future offspring. Again, in the case of the dog-fish—the plague of fishermen—how different. Here the young are brought forth, after the fashion of mammals, fully developed. A common sight in fishing boats where these pests are brought on board, is to see the finger-long juveniles swimming briskly about in the bilge-water with the yolk-sac still attached. In some parts it is customary to split and dry these fish for winter consumption, though the flavour of roasted “dogs” would scarcely recommend itself to anyone unaccustomed to its use, nor its relationship to fish even be suspected. The liver at one time supplied the natives of the Hebrides with lamp oil, and was also considered a panacea for all bovine ailments, the method of administering the dose being to keep the head of the cow elevated while the mouth was forced open, and the entire liver, as removed from the fish, slipped gently down the throat; no “sugar-coated pills” about that!

Spring tides occurring at the “full” and “change” of the moon, and our gratings consequently being then uncovered for a much longer period each tide, the “reliefs” are so

arranged as to fall on or about these dates. Consequently, during the winter months, when the reliefs are made after dark, there is always the chance of every alternate relief being favoured with full moonlight. On the night of the 18th our final relief for the year was effected in comparatively quiet weather. At relief times, providing the weather is quiet, the landing gratings begin to uncover when the ebb has run four hours. Whenever a footing is possible the keepers descend with the signal-lamps, and by their colour—red, green, or white—indicate to the relieving steamer the landing they consider it safest to attempt. Two boats are immediately dispatched from the steamer in charge of the first and second officers, and, guided by the steamer's searchlight, cautiously approach the landing signalled. Given quiet weather, the narrow passages leading to the different landings are easily negotiated, though to a stranger, even in quiet weather, the attempt would be extremely hazardous. Should there be any surf on the Rock, the boats take up a position as near the entrance as is prudent with safety, and there wait the opportunity of a lull. This generally occurring at the termination of three bigger waves than usual, the officer gives the word, and the first boat shoots forward into the boiling track. Talk about "shooting the rapids," why, it isn't a circumstance to it. Swinging through "Johnny Gray" track on a dirty night in mid-winter is quite "rapid" enough to satisfy the most morbid desire for excitement. At times disaster lies beneath the very oars, but the necessary impetus has already been given to the boat, and she clears it with a rush, to be met the next moment with a drenching sea on the port bow, which threatens to slew her upon the opposite ledge, despite the strenuous resistance of the starboard oars, the tips of which grate on the shelving ledge as they urge her through the narrow channel into safety, the entire effort affording a splendid demonstration of the necessity for doing the right thing at the right moment. The seamen understand exactly what is expected of them, and respond with alacrity to the officers' orders. Despite the danger attending such work, that no serious accident has ever been recorded

reflects much credit on all concerned, from the captain, who, as a boy, began his career on board the vessel which he now commands, downwards. Particularly is the second officer—a veteran of forty years' experience in this work—to be congratulated on the possession of a "clean sheet" after such protracted service in what is frequently an extremely hazardous calling.

## *JANUARY 1904.*

THE weather continues dull and dark, but comparatively quiet—a matter of much importance to us at relief times. We have no aversion to a rousing gale between reliefs; then one can afford to appreciate the grandeur of the warring elements; but as the appointed time draws near, and no sign of abatement is evident, all hands become a trifle uneasy, especially the man whose turn it is for shore duty. It is rather tantalising to see the relief steamer cruising doubtfully round the Rock, then finally take her departure, unable to effect a landing, all on account of “that nasty swell,” which possibly a week ago we were eulogising as “sublime!” It is a matter of remark here how quickly the boisterous nor'-east seas are subdued by the westerly wind. At times the morning presents a scene anything but peaceful, the whole reef enveloped by shouting, tumbling seas, which bang our domicile till the crockery rattles, and blind by their spray our kitchen windows, seventy feet from the Rock—yet, let the wind but freshen from the westward and the conflict immediately becomes visible. The seas, now driving in the teeth of the wind, have their curling crests whipped cleanly off and carried leeward like clouds of steam. Perceptibly their force diminishes as they “lift and 'scend” in the struggle for supremacy, till by evening tide a comparatively easy relief may be effected. Home news and the doings of the outer world are then at our disposal, as well as a welcome consignment of fresh provisions. Considering his almost seven weeks' confinement on the Rock, the shore-going keeper may be pardoned a feeling of relief and elation as he steps on board the relieving steamer—a feeling, by the way, not at all to be confounded with that of the return journey. As an

instance how dissimilar the same object may appear from different view-points, our lonely habitation never seems to assume such a pleasing aspect as when seen vanishing astern. Verily, it is we who appreciate the truth of the Irishman's illogical remark that "the best thing about going away from home is getting back again."

A round of the different fishing pools was made this month at low water, resulting in the capture of a most unhealthy-looking specimen of a poddley in the "Hospital" (Neill's Pool). Long, lank, and lean, a post-mortem revealed the liver attenuated to a mere thread. It is most remarkable why these sickly fish should favour this pool alone. About twenty feet in diameter and twelve feet deep, with the bottom thickly strewn with rounded boulders, there is always a shallow wash into it at the lowest state of the tide. Possibly its greater depth offers a safer refuge for these convalescents than the other pools. Whatever the reason, the fact remains that in this pool alone these specimens are found; not only poddlies, but lythe and cod as well. With the flying fish of the tropics we are more or less familiar, and of tree-climbing fish and overland travellers we have the testimony of travellers that such perverse specimens do exist. The *ceratodus* of Queensland, for instance, which, with its peculiar respiratory arrangement and ambulatory fins is enabled to transport itself over swampy ground in migrating from pool to pool, a feat suggestive of the Yankee's shallow-draught steamer, to which an ordinary meadow was easily navigable, providing there had been a heavy dewfall. The cause of these reflections was the discovery of a small fish, some four inches in length, on the cleaning path encircling our lantern, over a hundred feet from its usual habitat. Of the "cobbler" variety, the expanded pectoral fins might, with a little imagination, be imbued with the powers of flight, but more than likely our visitor owed its exalted position to some predatory gull, which, unable to bolt its victim or escape from covetous neighbours, had dropped it where found.

A solitary lapwing was our only feathered visitor for the

month. Apropos of these days of "retaliation," there is an old Scottish Act of Parliament of the time of Edward the First relating to this bird, in which all its eggs are ordered to be broken when found, "in order that Peesweeps may not go south, and become a delicious repast to our unnatural enemies the English!"

A quiet night on the 31st seemed to augur favourably for our relief, which was due the following evening; by that time, however, the prospect was completely changed by a strong sou'-east wind, and consequently heavy sea, which rendered landing extremely doubtful. The following morning the *Pharos* made her appearance, and attempted a landing at daybreak. The two boats despatched from the steamer for this purpose, on approaching the Rock, found the passage unsafe to attempt, and returned to the steamer. Weighing anchor, the *Pharos* proceeded to the relief of the North Carr Lightship, where, owing to the tempestuous state of the weather, she broke the hawser by which she moors to the lightship three times during the operation. Landing the relief men from the lightship and Bass Rock—which had been relieved the previous day—at North Berwick, and sheltering overnight at the Isle of May, she returned to us on Wednesday morning and succeeded in effecting the relief.

FEBRUARY 1904.

CORMORANTS have been more in evidence here this month than usual. At present a flock of thirteen is to be seen diving in the deep water surrounding the reef. Scorning the crustaceans, molluscs, and other ground game of the eiders and long-tails, these birds subsist entirely upon fish, in pursuit of which they are extremely dexterous. The long sharp-pointed bill is excellently adapted for securing their prey, the extremity of the upper mandible curving over the lower in a sharp hook, the efficiency of which I once saw forcibly demonstrated. One of these birds, while flying high overhead, was winged by a gunshot, and on striking the ground disgorged a recently swallowed poddley, some ten inches long. A boy of the party, having the temerity to thrust his foot towards the bird, had the upper leather of his boot pierced and the foot slightly wounded by the sharp hook-like process of the upper mandible. During an exceedingly rigorous winter in Orkney—in '94, if I remember aright—hundreds of these birds perished from hunger. In a roofless hut, a few yards from high-water mark, I counted fourteen dying and dead. Rats were busy devouring the dead, while the living stumbled weakly over the half-eaten bodies of their comrades. In the most unlikely places they were to be met with, coming right up to our doors as if begging for shelter. One of them surprised me by waddling into the workshop, passing over my boots as if unconscious of my presence, and settling underneath the bench to die. Any food we could offer them was always rejected. One evening my attention was drawn to our poultry, which, instead of being on their roost, stood huddled about the entrance. Thinking the entrance had been accidentally blocked from within, I entered by the door-

way to investigate. Judge my astonishment at finding "Mister *Phalacrocorax Carbo*"—such is the cormorant's scientific title—standing Horatius-like holding the diminutive passage against all comers. Wisps of feathers, with shreds of skin adhering to them, lay strewn in front of him, while his effective "hook" gleamed gory from the carnage. Needless to state, his ejectionment was summarily effected. When in pursuit of prey their method of diving is conspicuously different from other birds of the diving fraternity, and they may be identified at a long distance by this peculiarity alone. Bracing themselves together, they spring forward as if surmounting some imaginary obstacle on the surface, the entire body assuming the form of an arc, reminding one of a fractious pony in the act of "bucking." The ducks, on the other hand, with wings half open, merely topple over and under, turning on their own axis, so to speak. Having secured a fish, it is brought to the surface, where, after some preliminary adjustments to facilitate transit, it disappears head first, the long neck denoting its course by "swelling visibly." This is the bird which the Chinese train to fish for them. A ring is placed on the bird's neck, which prevents it appropriating its earnings for its own use. Whenever a swollen neck appears the owner is hauled on board the "sampan," and the "swelling" reduced by a rough and ready form of massage. Occasionally the constricting ring is removed, and the bird permitted to enjoy its catch as a stimulant to further exertions. History records the use of this bird for similar purposes in our own country in the olden times, a leather strap being used instead of the ring. Last year, fishermen in the south of England petitioned for power to destroy these birds at all seasons on the plea of the destruction caused by them amongst fish in the estuaries. The cormorant measures three feet in length, and belongs to the pelican family, of which we have but two other British representatives—the shag, a smaller edition of the cormorant by eight inches, and the gannet or solan goose.

On several occasions during the month a seal was observed

sporting amongst the breakers. The other evening he was seen within a few yards of the tower, busy devouring a huge cod. Mastication was entirely dispensed with; tilting his snout in the air, each ragged mouthful disappeared at a single gulp. The fish was allowed to sink after every mouthful; and two or three minutes would be spent under water before bringing it to the surface for another attack. In a remarkably short time the head and backbone alone were left.

Our feathered visitors for the month were represented by a couple of skylarks, three song thrushes, a pair of carrion crows, and a solitary starling. Eiders and longtails still continue in attendance, and gannets are now plentiful. The latter arrived at their breeding haunt on the Bass Rock from their southern sojourn on the 9th of last month.

The month has been wet, cold, and stormy, exceptionally heavy seas prevailing in the earlier half. The closing day of the month was beautifully clear and sunny, but cold and frosty, our heliograph intimating on that date a similar state of weather on shore.

### MARCH 1904.

OF the mighty steeds of illustrious riders, from the Bucephalus of Alexander down to the famous chargers of our present-day Generals, much has been written and even sung. Favourites of fortune, their lives were mostly cast in pleasant places; and after a brilliant career, more or less useful, permitted to end their days in secluded luxury—a privilege, by the way, not always extended to their riders. The subject of these remarks is in no way connected with the glorious achievement of arms, nor is it recorded that he ever scented the battle even from afar; yet, though compelled to wear, so to speak, the hodden grey of equine society, his claim to distinction may none the less be justified.

In July 1810, a somewhat queer procession might have been seen wending its way through Edinburgh towards the Port of Leith. Upon a cart, drawn by a powerful horse, decorated with bows and streamers of various colours, and driven by James Craw, the famous Bell Rock carter, similarly bedecked, lay the last principal stone of the Bell Rock Lighthouse. From the centre of the stone rose a flagstaff, carrying the national flag, while seamen and stonemasons—a strange combination—gaily bedecked with variegated ribbons—the latter donning brand new aprons for the occasion—marched in joyful procession. When abreast of the Trinity House of Leith, they were joined by the Officer of that Corporation, resplendent in full uniform, and bearing his staff of office; and on arriving at the harbour, where the *Smeaton*—engaged in transporting material to the Bell Rock—lay, the entire shipping hoisted their colours in salute, thus indicating the amount of public interest evinced in the progress of the Lighthouse.

An item of interest, at this time, was a visit by Mrs Dickson, a daughter of Smeaton of Eddystone fame—whose principles were largely taken advantage of in the construction of the Bell Rock Lighthouse—to inspect the vessel, named in honour of her distinguished father. “In stepping on board,” writes Mr Stevenson in his ‘Bell Rock Lighthouse,’ “Mrs Dickson seemed quite overcome by so many concurrent circumstances tending in a peculiar manner to revive and enliven the memory of her departed father; and, on leaving the vessel, she would not be restrained from presenting the crew with a piece of money.”

Though the site of the workyard in connection with the building was situated in Arbroath, from its contiguity to the Rock, it was found necessary, owing to the liability of the stones procured from Mylnefield Quarry, near Dundee, to injury from frost—from which cause many valuable stones had already been lost—to procure stones for the cornice of the building and parapet wall of the lightroom which would admit of being wrought with safety during the winter months. The desired qualities of durability and immunity from injury by frost were ultimately found in the famous Liver-rock of the Craigleith Quarry. At Greenside, Edinburgh, a vacant piece of ground was procured; and here the cornice and parapet wall were hewn and built in position for the fitting of the huge cast-iron lantern.

The horse in question had, with his driver, been employed in the workyard at Arbroath, and was computed to have drawn the materials of the lighthouse, extending to upwards of two thousand tons in its finished state, three or four times—in removing the blocks of stone from the ship to the workyard, again to the platform upon which each course was temporarily built, from the workyard to where they were shipped for the Rock, besides occasional movements to and from the hands of the stonecutters. Deciding that “Bassey” and his driver should have the honour of participating in the closing scene of the undertaking, they were accordingly transported by sea to Leith.

In the course of their passage in the *Smeaton*, the vessel narrowly escaped shipwreck. Under orders to call at the Rock for lumber, they had apparently lost their bearings through fog; for, suddenly startled by the sound of the smith's hammer and anvil, they had just time to put the ship about and escape running full tilt on the north-west portion of the Rock, which, from this incident, still bears the name of "James Craw's Horse."

On the completion of operations at the Rock, the horse "Bassey," failing somewhat from age, was pensioned off by the Commissioners, and allowed to roam at liberty on the island of Inchkeith till his death in 1813. "The fame of this animal's labours," writes Mr Stevenson, "together with his strength and excellent proportions as a draught-horse, having attracted the attention of Dr John Barclay, that eminent anatomist procured the bones and set them up in his museum. This valuable collection, it is understood, is to be bequeathed to the College of Surgeons of Edinburgh; so that the bones of the Bell Rock horse" (to use the doctor's own language) "will be seen and admired as a useful skeleton and a source of instruction when those of his employers lie mingled with the dust."

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With the exception of a few days, the weather this month has been extremely favourable; indeed, for the greater part, summer-like—a pleasant change from what we have experienced of late. The peculiar white rubber-like folds of ribbon which have been adhering to the Rock surface for the past two months, and which we erroneously supposed to be the ova of some fish, turn out to be the spawn of the slugs I have already described, and with which the Rock has been freely invested of late—proof of which several have been seen in the act of extrusion. These shell-less molluscs have been much in evidence this season; and representatives of three distinct families are to be met with, namely, the Onchidoridæ, Tritoniidæ, and Eolididæ. Cannibals, they attack their own species without compunction, and devour each other's spawn.

Darwin computed that some "ribbons" contained as many as six hundred thousand eggs. The acorn barnacles which have escaped the voracity of the white whelks have in some places attained a height of two inches. On examination, each shelly casement is seen charged with spawn, which, later on, will be liberated as free swimmers, totally unlike the parent form, to enjoy a brief period of unrestricted freedom before settling down on the Rock surface, or, for that matter, any immersed object that comes handy, and ultimately assuming the adult form. The young swimmer, feeling itself gradually becoming invested with a shelly covering, casts about for a suitable site to pass the remainder of its existence. Selecting the Rock surface, it attaches itself by its head, the antennæ become cemented to the surface, the eyes remain in a rudimentary form, the shelly plates which latterly form the door of its domicile appear, a few more pairs of legs are developed, and by a series of frequent moultings (like other crustaceans) arrives at the perfect state. The bunches of "fingers" which we see this animal protrude and withdraw when under water are in reality its feet, of which there are twelve pairs, the rhythmic expansion and contraction of which induce a current in the water attracting to its mouth the minute objects upon which it feeds, thus giving rise to the saying that this animal stands on its head and literally kicks its food into its mouth. In all other crustacea the sexes are distinct, the barnacles alone having the peculiarity of being bi-sexual, or having both sexes united in the same individual. The general tendency throughout nature—the evolution from a lower to a higher order, from the simple to the complex—appears in the case of the barnacle to be reversed. Gifted in the initial stage of its existence with all the functions of a free-swimming animal, and possessing organs which ultimately become rudimentary, the final phase in which all power of volition is lost, certainly does not appear one of progression.

Hermit crabs are at present abundant, and also demonstrate their wonderful fecundity. Starfishes—principally the five-rayed variety—are now numerous, and garnish each

shallow pool. Sea-urchins, though never plentiful here, are occasionally met with, some having been found recently no larger than a pea. On the 20th the advent of the paidle-fish was announced by a small patch of ova underneath a projecting ledge of rock, and, on the same date, by a reconnoitring "cock." The young of last summer are met with adhering to stones in the shallow pools; and, contrary to our expectations, though only two inches long, were found to contain spawn. The spring migratory movement has sent but few birds our way this year. A few thrushes, blackbirds, larks, starlings, and a couple of pied wagtails composed our list. By the middle of the month, the longtailed ducks had gone north to nest, and but four pairs of eiders now remain.

## APRIL 1904.

A PERUSAL of Stevenson's "Bell Rock Lighthouse" reveals many interesting episodes of that period in connection with the undertaking. The following facts are from this source, and may be of sufficient general interest to warrant repeating. The facts mentioned have reference to another providential escape from serious disaster recorded during the earlier stages of the operations. The workmen at this period had their quarters on board the lightship, anchored a mile from the Rock, as the beacon-house, on which they were latterly housed on the Rock, had not yet been erected. As was customary, whenever the tide admitted of a footing on the Rock, all hands were landed, and the boats retained in one of the creeks till the rising tide suspended operations. On this particular occasion, besides the usual two boats from the lightship, they were reinforced by an additional boat from the *Smeaton*, which had arrived from Arbroath with a fresh consignment of workmen. The wind freshening in the course of the work, the seamen of the *Smeaton*, fearing for their vessel's moorings, left the Rock in their own boat with the intention of taking some extra precautions, and returning. Scarcely had they boarded her, however, when, to Mr Stevenson's consternation, she was seen to break adrift and drive helplessly away before the wind. The danger of the situation at once flashed through his mind. Thirty-two men—three boat-loads—on a rock which would shortly be fathoms under water, with only two boats at their disposal! What was to be done? The workmen, engrossed in their labours, had failed to notice the departure of the boat, and were as yet ignorant of their dangerous position. The *Smeaton*, now far to leeward, was seen to have made sail, and making every

effort to beat up to the Rock, but with the wind still freshening and the flood tide dead against her, it was utterly hopeless to expect any assistance in that direction. Save the deserted lightship no other sail was in sight. Taking the landing-master cautiously aside, to avoid alarming the men, he explained their dangerous situation. After consultation, it was decided that everything of weight should be abandoned, the men to strip their upper clothing, the two boats to be manned to their utmost capacity, and the remainder of the men to support themselves in the water by clinging to the gunwales. By this means they hoped to drift down on the *Smeaton*, a perilous journey under such circumstances, even in quiet weather, but in the now disturbed state of the sea, a forlorn hope. The workings being now awash with the flowing tide—the usual signal for ceasing work—the workmen were in the act of retiring to the boats to don their shoes and stockings when they noticed the absence of the boat, and realised their danger. On attempting to address them with his proposal, Mr Stevenson found his mouth so parched that he was totally unable to articulate a single word. Stooping to moisten his lips with sea water, he was suddenly startled by the gladsome shout of “A boat! A boat!” and looking around, there, sure enough, a large boat was seen through the haze making straight for the Rock. This opportune arrival proved to be James Spink, the Bell Rock pilot, employed in carrying letters between Arbroath and the Rock. For his services on this occasion it is gratifying to learn that in after years Spink was in receipt of a pension from the Board, and permitted to wear the uniform and badge of the Lighthouse Service.

Paidle-fish are now fairly numerous, their nests, with attendant cocks, being met with on every hand. While observing one of these nests the other day, at low water, I had an interesting experience of the necessity for the surveillance exercised by the cock. Stretched along the rock, my face close to the surface of the pool, I had an excellent view of the nest and its guardian, two feet below.

Speculating as to the reason for so close attendance on the ova—his nose being thrust into an orifice in the mass, his mouth opening and shutting energetically, evidently forcing a stream of water through the opening—I carelessly dropped a few whelks on his back. This mild form of bombardment did not in the slightest disconcert him; for, though they struck and rolled off on either side, he appeared to take no notice of them. Suddenly, a white whelk (not one of those I had dropped) made its appearance on the outer margin of the ova, and settled down with the apparent intention of dining. This impertinence, however, was not to be tolerated; for, with a swirling rush that plainly betokened anger, the red-coated sentry seized the offender in his teeth—and here follows the surprising part of it. Instead of dropping the whelk to the bottom there and then, as I expected, he mounted rapidly through the intervening two feet of water, and when near the surface, to my astonishment, spat the whelk almost into my face! That his intention was retaliatory I do not presume to say, but the action certainly appeared an intelligent attempt to “return fire.” Since then, I have repeatedly seen them remove predatory starfishes and whelks in a somewhat similar manner.

The wheat-like ova of the white whelks is also largely in evidence this month, though somewhat later than last year. Exposed at every fall of the tide, it appears to require no attention, each capsule, pendant or upright, firmly adhering to the Rock surface by means of its flattened foot-stalk. The whelks themselves appear in every conceivable corner where food is to be found.

A shallow pit cut into the Rock, measuring two feet by one, and one foot deep—originally the socket of the central support of the beacon-house in which the workmen were lodged during the construction of the lighthouse—serves as a receptacle for anything of interest we may pick up during our rambles round the rocks. Fitted with a grated iron cover, it was at one time used for the purpose of soaking salt junk; but, as every marine organism appeared to con-

sider this a special provision for their needs, it was ultimately abandoned. At present a repulsive-looking "poach" or "cobbler," some ten inches long, shares this prison with a couple of large star-fishes, an unusually large hermit crab, and a derelict mass of "paidle" spawn. The spawn daily decreases in inverse ratio to the "poach's" liveliness. Apart from this, however, the spawn shows signs of deterioration, a proof that the attention of the cock is necessary for its well-being.

On the 17th, the remaining four pairs of eiders took their departure, and only a few gulls now remain.

Owing to my transference to another station, it now becomes necessary for me to conclude these random jottings. To the patient reader who has cared to follow me through these notes I bid farewell. Written without any pretensions to literary skill or scientific accuracy, they have nevertheless, in my case, served to enliven many a weary hour in an isolated calling, and have—may I hope?—proved not altogether void of interest to the reader.

THE END.

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